



The Global Language of Business

# GS1 Healthcare Reference Book 2016-2017

Stories of successful implementations of GS1 standards



A photograph of a female doctor with dark hair and a stethoscope around her neck. She is looking down at a globe of the Earth. Her right hand is holding the chest piece of the stethoscope against the globe. The background is a plain, light-colored wall.

What's inside

## **Safer, more efficient care starts with a simple scan** **4**

---

Contributors 5

## **Bedside scanning and patient safety** **7**

---

GS1 barcodes on medical devices reduces stock and enhances patient safety - Denmark 8

Galway Clinic transforms the patient journey with GS1 standards and EPC-enabled RFID - Ireland 12

Dôvera Health Insurance creates transparent prescription process for safer medications - Slovakia 16

Derby Teaching Hospitals use GS1 standards to make a real difference for patient safety - UK 20

Stryker's GS1 standards adoption journey- UK 24

## **Inventory management** **27**

---

Valle del Lili improves patient safety with automated inventory management - Colombia 28

Greek Army Medical Supplies Centre standardises warehouse operations for decisive results - Greece 31

North Lisbon Hospital Centre optimises logistics for quality of care - Portugal 34

OLVG transforms its stock management system and culture of care - The Netherlands 38

Cambridge University Hospitals implement GS1 standards to manage medical devices - UK 42

## **Order to cash** **47**

---

Ramsay Health Care getting the benefits of using GS1 standards - Australia 48

Optimising business operations with GS1 EDI business processes - Colombia 51

Using GS1 standards to improve EDI accuracy and achieve the perfect order - U.S. 54

## **Government initiatives** **63**

---

Indian government implements track and trace system for pharmaceuticals - India 64

The Value of Trusted Product Data 68



# Safer, more efficient care starts with a simple scan

Today's healthcare industry faces growing pressures as the number of patients accelerates and regulatory demands continue to emerge. All healthcare stakeholders are being challenged to eliminate errors in patient care while executing highly effective and efficient processes to control increasing costs.

Healthcare providers are especially strained to do more, better and with less. In response, they are collaborating with partners to extend the use of GS1 standards beyond the supply chain to the patient bedside for improved patient care, outcomes and safety.

GS1 standards are enabling healthcare providers to uniquely and automatically identify products, patients, caregivers, assets and locations for transparent processes across the healthcare value chain. GS1 standards provide a global common language—identification, barcodes and data sharing—so that all stakeholders can work together seamlessly. They provide yet another example of how technology can support medical practices.

In this reference book, learn about the tangible benefits of using GS1 standards throughout hospital and healthcare environments: Clinical staff can now spend more time with patients in their care, using data that is more accurate and complete. The automation of processes reduces human error and ensures the right product is available for the right patient at the right time. There are significant reductions in stock with automated stock management, faster order fulfilment with more efficient warehouse operations and full transparency with automated prescription processes. Mobile assets are easily tracked for cost savings and a government traceability system has been put in place in some countries to combat counterfeits. Electronic order-to-cash processes are streamlined and patients are waiting much less time for procedures.

It's clear: The use of GS1 standards needs to become a strategic priority for hospitals worldwide. They have come to realise that with the simple scan of a barcode, they can build a better and safer environment for clinicians, staff and patients alike. We're at the start of a critical, yet exciting journey!

Learn more about these stories or tell us *your* implementation story. Contact Tania Snioch at [Tania.snioch@gs1.org](mailto:Tania.snioch@gs1.org) or Anouk Chavel at [anouk.chavel@gs1.org](mailto:anouk.chavel@gs1.org). For your nearest GS1 Member Organisation, go to [www.gs1.org/contact](http://www.gs1.org/contact).



# Contributors

GS1 Healthcare would like to express its gratitude to the following organisations and experts who contributed to this 8<sup>th</sup> edition of the GS1 Healthcare Reference Book:

- **Becton, Dickinson and Company** – Dennis Black, U.S.
- **Cambridge University Hospitals NHS Foundation Trust** – Simon Dawkins, UK
- **CHRISTUS Health** – John Mazzoli, U.S.
- **Coopidrogas** - Nazly Chacon, Colombia
- **Department of Health** – Steve Graham, UK
- **Derby Teaching Hospitals NHS Foundation Trust** – Kevin Downs, UK
- **Dôvera Health Insurance** – Radomír Vereš, Slovakia
- **Dstiny Organisatieverbetering** – Herman de Smit, The Netherlands
- **Franciscan Missionaries of Our Lady Health System** – Sandi Michel, U.S.
- **Galway Clinic** – Mark Sheehan, Ireland
- **Geisinger Health System** – Kevin Capatch, U.S.
- **Greek Army Medical Supplies Centre** – Sotirios Tsiafos-Tsiaras, Greece
- **National E-Health Transition Authority** – Paul Broadbridge, Australia
- **National Informatics Centre** – Anil K. Sinha, India
- **North Lisbon Hospital Centre** – Nuno Loureiro, Portugal
- **OLVG** – Margret Beliën, Ingeborg Wanrooij, Tanja Zenel, The Netherlands
- **Ramsay Health Care** – Andrew Potter, Australia
- **Region of Southern Denmark** – Sine Carlsson, Denmark
- **Resource Optimization & Innovation/Mercy Health** – Matthew Mentel, U.S.
- **St. James's Hospital** – Vincent Callan, Ireland
- **Stryker** – Mary Beth Krantz, Shannon Pfau, UK
- **University Medical Centre Schleswig-Holstein** – Dr. Hajo Reissman, Germany
- **Valle del Lili Foundation** – Victor Lopez, Colombia

We would also like to thank the GS1 Member Organisations who helped facilitate the creation of this book:

- **GS1 Australia** – Catherine Koetz, catherine.koetz@gs1au.org; Marian Makram, marian.makram@gs1au.org
- **GS1 Colombia** – Monica Gasca, mgasca@gs1co.org; Leonel Pava, lpava@gs1co.org
- **GS1 Denmark** – Jesper Kervin Franke, jkf@gs1.dk; Anne Aarslev Schmidt, asc@gs1.dk
- **GS1 Greece** – George Sarantavgas, g.sarantavgas@gs1greece.org
- **GS1 India** – Varsha Anand, varsha@gs1india.org
- **GS1 Ireland** – Siobhain Duggan, siobhain.duggan@gs1ie.org
- **GS1 Netherlands** – Rachel van Rhijn, rachel.vanrhijn@gs1.nl; Esther Peelen, esther.peelen@gs1.nl
- **GS1 Portugal** – Beatriz Jorge, b.jorge@gs1pt.org; Silvério Paixão, s.paixao@gs1pt.org
- **GS1 Slovakia** – Marianna Revallová, revallova@gs1sk.org
- **GS1 UK** – Vanessa Corley, vanessa.corley@gs1uk.org; David Weatherby, david.weatherby@gs1uk.org; Glen Hodgson, glen.hodgson@gs1uk.org
- **GS1 US** – Annette Pomponio, apomponio@gs1us.org





Bedside scanning  
and patient safety

## Bedside scanning and patient safety

# GS1 barcodes on medical devices reduces stock and enhances patient safety

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

*By Sine Carlsson*



## Inventory management in surgical wards

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

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

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

## Manual processes introduce risk for patients

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

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

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



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

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

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

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

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



Before the manufacturer had to visit the ward and manually audit each product to ensure the validity of expiry dates. Now with the digitised order exchange and agreements, the region has become a stronger business partner.

Time previously spent on ordering and ensuring correct order submission has been reduced by

**75%** on average.



## Scanning barcodes for a safer process

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

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

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

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

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

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

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

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

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

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

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

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

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

## Optimising stock levels for patient safety

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

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

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

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

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

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

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





The new inventory management system has helped reduce the number of products since it now records products held in stock and their locations. As a result, the ward can rest assured, knowing that the stock, and ultimately patient safety, is under control.

## A scalable system built on GS1 standards

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

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

---

### About the Author



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

---

### About the Region of Southern Denmark

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

[www.regionyddanmark.dk](http://www.regionyddanmark.dk)



## Bedside scanning and patient safety

# Galway Clinic transforms the patient journey with GS1 standards and EPC-enabled RFID

In 2004, Galway Clinic opened its doors with a simple, yet powerful mission: To improve the health and quality of life of the individuals and communities served. Now 12 years later, this state-of-the-art hospital in western Ireland is focused more than ever on its patients. Using GS1 standards and EPC-enabled RFID (EPC/RFID), Galway Clinic has made significant progress to improve each patient's experience while in its care. And it still continues to explore new ways to use standards and technology for the benefit of patients and clinicians alike—something it calls “our amazing journey.”



*By Mark Sheehan*

## A great privilege

Galway Clinic is a hospital that welcomes patients of all faiths and cultures, providing the latest in healthcare services. With more than 120 physicians and surgeons, the Clinic has 146 in-patient beds, a same-day surgery unit, emergency room, seven operating suites, an endoscopy suite, cath lab and oncology day unit.

When visiting Galway Clinic, patients, families and guests can't help but notice its very different environment from most hospitals.

“From its infancy, our vision for the Clinic was to provide an environment of comfort coupled with the use of technology to improve the patient's journey and outcome,” says Mark Sheehan, Business Development Manager. “Today we continuously work to realise our vision, guided by the belief that caring for patients is a great privilege that comes with great responsibility.”

Mark Sheehan's focus on the patient is not a coincidence—it's in his DNA. His father, James Sheehan, is an orthopaedic surgeon who pioneered, in the early 80s, the use of passive RFID chips in surgical swabs. To prevent swabs from getting lost inside patients, James Sheehan

“We continuously work to realise our vision, guided by the belief that caring for patients is a great privilege that comes with great responsibility.”

developed a system whereby a passive RFID chip was embedded in each swab. At the end of each surgery, the patient was scanned using a handheld RFID reader to ensure all swabs were removed. There were also stationary RFID readers installed at the entrance to the operating theatre for added scanning and safety.

Today, this innovative spirit is a part of the Clinic's daily operations as it works to transform the patient's hospital experience and eliminate inherent risks. “Patients should never wait for long periods of time for a procedure,” says Sheehan. “Making patients wait who are perhaps worried is only exacerbating their anxiety and potentially making them sicker.”

Sheehan also recognised that one of the biggest areas of risk in any hospital is medication management. “We started our journey six years ago, using GS1 standards and RFID for the well being and safety of our patients.”

## Doing the research

The Galway Clinic's initial use of GS1 standards and EPC/RFID was a 2010 joint initiative between GS1 Ireland, Georgia Tech Ireland (GTI) and the Western Vascular Institute to develop a model for tracking endovascular devices such as catheters and stents, from manufacturing site to operating room. Known as the Clinical Laboratory Automated Stockroom System, the Clinic discovered it could improve patient safety by reducing the risk of errors, out-of-stock situations and product expirations. By more effectively managing inventory, this improvement had a profound impact on the patient.

Yet, tracking a patient throughout the Clinic presented yet another challenge in 2013.

"To fully understand the patient's experience, we needed visibility into their journey and the wait times for different procedures," explains Sheehan.

The Clinic continued to research the role of RFID in healthcare with help from GS1 Ireland. During the implementation trials, Sheehan was introduced to a GS1 Ireland Solution Partner, Aerospace Software Developments (ASD) that had accomplished some impressive results in the airline industry using passive RFID. Leveraging this experience and together with the Clinic, ASD created MEDRFID, the Clinic's RFID system that now links to its electronic health record system among other systems within the Clinic.

"We needed one RFID system—not multiple ones—that could easily scale for use in different processes," says Sheehan. "For one standardised system, GS1 standards provided us the needed foundation to design and build our improved patient journey."

---

"Staff or caregivers at the Galway Clinic are also uniquely identified with the GSRN encoded on an EPC/RFID tag."

## Tracking the patient journey

When admitted to Galway Clinic, each patient is now presented with an identification wristband with his or her own GS1 identifier called a Global Service Relation Number (GSRN). An intelligent RFID printer prints the wristband with the GSRN encoded in an EPC/RFID tag. Human readable information such as the patient's first and last name is also included.

"As patients pass through each of the points in the hospital with antennae and readers, the MEDRFID system records their movements," explains Sheehan. "We are now aware of how long a patient has been in a particular area, and we get alerts on our main administration screen as they enter and leave. We are examining the waiting-time trends in certain areas to determine how to improve our clinical processes."

Staff or caregivers at the Galway Clinic are also uniquely identified with the GSRN encoded on an EPC/RFID tag.

"A screen in Room 202, which is our live patient test room, informs patients if someone walks into their room, providing the person's name and role. This level of identification makes patients feel better, knowing who is caring for them, and it helps us better understand where our resources are throughout the hospital at any given time, and for the length of time in certain areas. We are in the process of installing these intelligent patient touch screens in every room," says Sheehan.



More than 30 years ago, James Sheehan, an orthopaedic surgeon, used passive RFID chips in surgical swabs for greater patient safety.

Pictured here is one of Dr. Sheehan's original swabs with the embedded RFID chip.

Using GS1 standards with EPC-enabled RFID, Galway Clinic has achieved more than a 90 percent read rate of patients wearing the wristband. Furthermore, the average patient wait time for a CT scan has been reduced from more than 20 minutes to less than 7 minutes—a 65 percent improvement.

Sheehan adds, “The patient journey is now fully visible for all of our staff, and with our MEDRFID system, we can generate automated reports that identify all aspects of the journey.”



Patient movements are captured by means of RFID readers installed at doorways.

## Bedside scanning for a safety match

When it comes to medication management, the Galway Clinic is also taking a creative approach to ensure the right patient gets the right medication at the right time. The Clinic introduced a new process whereby doctors can electronically issue prescriptions for patients, addressing any potential errors (or extra time spent by pharmacists clarifying instructions) that are caused by illegible instructions. Upon receipt, the pharmacist checks the order and then creates a unit dose package (using a robot) that includes the appropriate medication identifier encoded in a barcode.

The unit package dose is then sent via a pneumatic tube to the patient’s bedside. As the nurse administers the medication, the patient’s barcode on the wristband is scanned, along with the prescribed drug’s barcode as well as the nurse’s identification barcode.

The results from the new medication management solution include an estimated 15 percent reduction in spend on oral solids along with improved productivity for the two full-time pharmacists who support the entire Clinic. Medication errors have also been reduced with no litigation since its implementation.

## The next leg of the journey

The next phase of the Galway Clinic’s journey continues to focus on patient safety with three major projects. “We have fully integrated the patient identification data with our electronic health record system. We are now linking this data with our PACS (picture archiving and communication system) so that as the patient enters an area, their identification data is automatically logged in the systems. This is another step for reducing human errors.”

A second project involves the Clinic’s central sterilising department and its very labour-intensive process of sterilising surgical instruments. Before each surgery, all instruments for the procedure are counted twice before going through large sterilising units. When coming out of sterilisation, they are double counted again and after the procedure, another count is taken. According to Sheehan, the counting process takes easily two to three hours of labour per procedure by healthcare assistants, the nurse, and/or the technicians working in the operating theatre.



“Imagine if all of those instruments each had a GS1 identifier in an EPC/RFID chip. We could simply put the tray with the instruments on top of a reader that instantaneously told us the identity of the tray, the number of instruments and that all were present—and this happens in about two to three seconds. It has the potential to provide us with huge labour savings as well as a high degree of accuracy—a very exciting value proposition.”

The third area of work is expanding the Clinic’s stock management system using GS1 standards and the Twinbin system, a replenishment model based on RFID technology. Sheehan explains, “In hospitals, we carry a lot of stock since it is critical to have enough on hand for patients. We carry on average about €2 million worth of stock. Our goal is to reduce this amount by 50 percent using GS1 standards, which is realistic based on trial results of this solution in the radiology department.”

## A rock-solid foundation for the future

Implementing GS1 standards has given the Galway Clinic a rock-solid foundation on which to build its multiple EPC/RFID solutions. Sheehan also comments that GS1 Ireland’s support has been invaluable based on their sharing of best practices and introduction to Aerospace Software Developments.

“Our success ultimately comes back to standardisation. Once we had a standard system of identifying what we wanted to track, we found that we could move much quicker,” says Sheehan.

As Sheehan reflects on the Clinic’s more-than-decade use of GS1 standards, he offers some advice for healthcare providers. “If it’s the right thing to do for the patient, it’s worth doing and we need to find a way. And there’s always a way. We just have to be willing.”

“We carry on average about €2 million worth of stock. Our goal is to reduce this amount by 50 percent using GS1 standards, which is realistic based on trial results of this solution in the radiology department.”

Using GS1 standards with EPC-enabled RFID, Galway Clinic has achieved more

than a **90%** read rate of patients wearing the wristband.

The average patient wait time for a CT scan has been reduced from more than 20 minutes to less than

7 minutes—a **65%** improvement.



### About the Author



**Mark Sheehan** is the Business Development Manager for Galway Clinic. He was part of the small team that built

and commissioned Galway Clinic in 2004 and has worked within the Clinic ever since. In 2013, Sheehan led the opening of the Limerick Clinic that he now manages. Passionate about using technology within healthcare to enhance the patient journey and outcomes, Sheehan has been central to the Clinic’s adoption of information technology. The Galway Clinic was the first hospital in the British Isles to achieve the HIMSS Stage 6, an award that recognises organisations who use health information technology to improve patient safety, care outcomes and cost savings. Sheehan holds a Bachelor of Commerce and Master of Finance from University College Dublin.

### About Galway Clinic

The Galway Clinic is a modern hospital that provides 24-hour healthcare services, welcoming patients of all faiths and cultures. There are more than 120 physicians and surgeons who have admitting and operating privileges and some have consultant suites within the Clinic. The Clinic has an occupancy rate of 95 percent and an average length of stay of 3.6 days. It has 146 in-patient beds with a same day surgery unit and emergency room. There are seven operating suites, an endoscopy suite, a cath lab and an oncology day unit.

[www.galwayclinic.com](http://www.galwayclinic.com)

## Bedside scanning and patient safety

# Dôvera Health Insurance creates transparent prescription process for safer medications

Dôvera Health Insurance, a privately owned company, decided to streamline the prescription fulfilment process for its healthcare providers, pharmacies and patients. The company developed a system that relies on GS1 standards to uniquely identify each prescription. Now the new process is completely automated and transparent for all players. Doctors issue prescriptions online with access to patients' electronic health records. Pharmacies can easily verify the authenticity of prescriptions and are reimbursed much more efficiently by Dôvera. With Dôvera's mobile app, patients stay engaged and informed with alerts and useful information about their healthcare. Emergency rescue and ambulance workers can access online prescription data when treating Dôvera patients.

*By Radomír Vereš*



## Making fundamental changes

Dôvera Health Insurance is one of the largest insurance companies serving the healthcare needs of 1.4 million Slovakian citizens. One of its many services is supporting pharmaceutical reimbursements in Slovakia where expenditures for drugs—as a percentage of total healthcare and the amount spent per capita—are some of the highest in the European Union and the Organisation for Economic Co-operation and Development (OECD).

Counterfeit prescriptions of these expensive pharmaceuticals have become a growing problem for healthcare providers, insurance companies, pharmacies and patients alike. At the same time, inefficiencies in the prescription fulfilment process has led to duplication in prescriptions and health risks—potentially severe or life-threatening—associated with adverse drug interactions and overdoses.

“We decided to address these issues by making some fundamental changes to the prescription process—to automate and make it more secure for the benefit of patients, doctors and pharmacies,” says Radomír Vereš, Chief Financial Officer with Dôvera.

“We decided to address these issues by making fundamental changes to the prescription process—to automate and make it more secure for the benefit of patients, doctors and pharmacies.”



## Significant time, labour and risk

Before these changes, the process was primarily manual and quite risk-intensive. When prescribing a drug, the doctor would complete a paper form with a signature or stamp as verification—a step in the process that could easily be falsified.

In addition, the doctor did not have access to the patient's health information such as current treatments and use of other drugs.

Even though doctors were conscientious about prescribing drugs, without a method to crosscheck potential interactions with other drugs or allergies, this still meant inherent risks for patients.

The pharmacy fulfilled the prescription by “visually” verifying the doctor's stamp with no real-time confirmation of the patient's identity or health history. Based on the type of insurance coverage, the patient would make either partial payment or no payment to the pharmacy. Each month, the pharmacy would manually re-enter all prescription information into its software program and submit all fulfilled prescriptions for reimbursement by Dôvera and other appropriate insurance companies.

Since Dôvera only received submissions monthly, it could mean up to a six-week delay of receiving and processing payments to pharmacies as well as updating its patients' electronic health records. In addition, the review process was labour intensive and manual, resulting in time delays for pharmacies receiving payments. And in cases of discovered counterfeit prescriptions, pharmacies would receive no payment at all.

---

“By scanning the barcode upon fulfilment, the pharmacy sends the prescription to Dôvera for reimbursement. It's a highly efficient process for us. Since Dôvera processes more than five million prescriptions each year, this translates into significant time and cost savings.”

## Identifying each prescription and reducing drug interactions

Consulting with GS1 Slovakia, Dôvera learned about GS1 standards. “We needed a standardised yet unique way to identify each prescription,” explains Vereš. “We selected GS1 since it provided a global system of unique identification that would support our requirements today as well as meet the needs of the Slovakian insurance industry in the future. In other words, if other insurance companies adopted a similar solution in the future, we can be assured that prescription identifiers will not be replicated among all companies using global GS1 standards.”

Dôvera, working with GS1 Slovakia and solution providers, developed the new prescription fulfilment process where each individual prescription now receives a GS1 Global Document Type Identifier (GDTI) with a serial number. The doctor creates each prescription online, with access to the patient's electronic health records, including the current list of drugs being taken. The Dôvera system assigns the serialised GDTI, and using the Dôvera system software, the doctor/healthcare provider prints the prescription with the GDTI encoded in a GS1-128 barcode. And because the prescription is electronic, the pharmacist can easily access it by scanning the barcode.

Each prescription is created online with a GDTI encoded in a GS1-128 barcode that uniquely identifies it.





Pharmacies using the new Dôvera prescription system save significant time and get reimbursed much faster by scanning the prescription's GDTI encoded in a GS1-128 barcode.

Dôvera is the first insurance company in Slovakia to introduce electronic health records for its insured patients. "Our system notifies the doctor if there is a duplication, conflicting interaction between drugs, or risk of overdoses," advises Vereš. "It's a much safer and efficient process for doctors and their patients."

Upon receiving the prescription, the pharmacist scans its GS1 barcode with the unique identifier. The Dôvera system verifies the patient's identity and the intended prescription, thus eliminating the risk of counterfeits. Pharmacies can now be assured they will receive payments for the prescriptions they fulfil. The newly fulfilled prescription is also added to the patient's electronic health record for future verification and ongoing safety measures.

The new process also means substantial time savings for the pharmacy. Previously, the pharmacist had to manually type all information from the written prescription to complete the fulfilment in the pharmacy's software. Now the prescription has already been created in the Dôvera system by the doctor when printing the prescription with a barcode.

"By scanning the barcode upon fulfilment, the pharmacy sends the prescription to Dôvera for reimbursement," explains Vereš. "It's a highly efficient process for us. Since Dôvera processes more than five million prescriptions each year, this translates into significant time and cost savings."

## Delivering transparency for health

For patients, the new Dôvera prescription process delivers improved health outcomes since it significantly reduces errors. In fact, Dôvera reports a 22 percent decrease in interactions with major consequences.

"There has also been a continuous decline of the number of patients taking more than five different medications simultaneously," says Vereš. "This reduces health risks since the more medications a patient takes, the higher the risk of potential interactions."

"If a patient visits her general practitioner in one town and specialist in another, all of her health records are now in one place," continues Vereš. "And as doctors use the new process to issue new prescriptions, her health record is automatically updated and accessible online while her personal data is well protected."

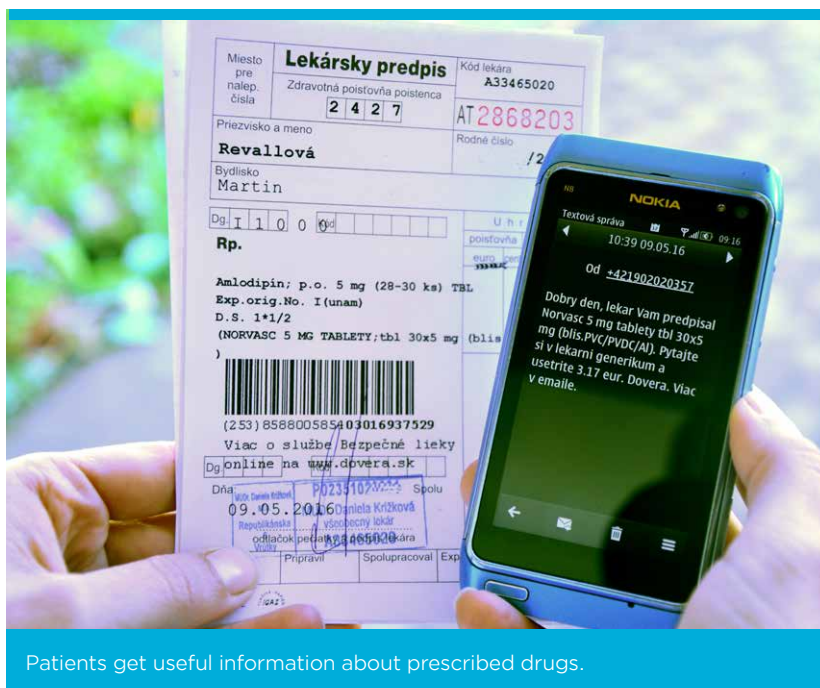
Patients can also use the new system to be an active part of their own healthcare management. With the mobile app, they access all types of useful information online like a list of prescribed drugs. They get alerts via text notifications when their doctor creates a prescription for them, about possible interactions and the availability of cheaper generic versions. This also enables patients to identify potential fraudulent prescriptions and contact Dôvera immediately.

"With GS1 standards, the prescription process has become transparent," says Vereš. "All players including patients now have visibility into the creation and fulfilment of prescriptions for authentication and verification, which all add up to patient safety."

For patients, the new Dôvera prescription process delivers improved health outcomes since it significantly reduces errors. In fact, Dôvera reports a

**22%** decrease in interactions with major consequences.





Patients get useful information about prescribed drugs.

“With GS1 standards, the prescription process has become transparent. All players including patients now have visibility into the creation and fulfilment of prescriptions for authentication and verification, which all add up to patient safety.”

## For safety's sake

In only six months, Dôvera developed the new prescription system for less than €1 million. As of October 2015, 40 percent of all healthcare providers (3,700 total, including doctors, nurses, pharmacists and other providers) have adopted the new system using GS1 standards.

To speed adoption of the new system, the company co-paid for all software development costs; for doctors, hospitals and pharmacies, using the upgraded system meant simply installing the new software version. “Our target is to increase the doctor adoption rate to 90 percent, especially considering the safety benefits for our patients,” says Vereš.

Dôvera understands that healthy patients are not only good for their own well being, but are also good for the well being of Slovakia's healthcare system. By gaining greater efficiencies and virtually eliminating counterfeits in its prescription process, Dôvera—with help from GS1 standards—is leading the way for healthier outcomes in Slovakia.

## About the Author



**Radomír Vereš** is the Chief Financial Officer and member of the Board of Dôvera Health Insurance.

Since 2006, Vereš has worked in healthcare, starting as the CFO of the Children's University Hospital in Banská Bystrica, Slovakia. He later moved to the University Hospital F. D. Roosevelt in Banská Bystrica as its CFO. He is currently focused on strategic projects for the company such as the creation of Dôvera's prescription fulfilment process.

## About Dôvera

Dôvera Health Insurance is a major, privately owned health insurance company in Slovakia with an estimated 30 percent market share. It is currently Slovakia's second largest healthcare insurance company, serving its 1.4 million members with a broad portfolio of services.

[www.dovera.sk](http://www.dovera.sk)

## Bedside scanning and patient safety

# Derby Teaching Hospitals use GS1 standards to make a real difference for patient safety

Derby Teaching Hospitals NHS Foundation Trust wanted to better manage product recalls as well as streamline its theatre processes. By using GS1 standards, Derby now captures and uses complete, accurate information to automate its operations and reduce the need for manual intervention and the risk of human error. These changes have resulted in a minimum of £300,000 savings per year, just in consumables used in general surgery. Even better, the clinical staff can now spend more time taking care of patients, clinicians use trusted data to collaborate for improvements in practices, and with a faster and more precise recall process, patient safety has increased.

*by Kevin Downs*

## Derby Teaching Hospitals NHS Foundation Trust

### Background

Derby Teaching Hospitals NHS Foundation Trust (Derby) provides acute hospital-based health services, serving a population of over 600,000 people in and around southern Derbyshire. The Trust runs two hospitals. The Royal Derby Hospital, which incorporates the Derbyshire Children's Hospital, is a busy acute teaching hospital, and London Road is the Trust's community hospital. The Trust also operates some satellite services at other hospitals.

---

The information that GS1 barcodes gives makes for an accurate, automated process that reduces the need for manual intervention and the risk of human error.

### The challenge of getting access to complete, accurate data

As with many Trusts, Derby was faced with the problem of managing product safety recalls quickly and efficiently, while minimising risk to the patient. The Trust was also concerned that they didn't have the accurate and comprehensive information required for the efficient clinical and business management of theatre operations. Traceability was a manual paper-based process, creating a drain on clinical time. Inventory levels of theatre stocks were high to ensure that stock was always available, but this led to wastage due to obsolescence and poor product life management.

Management information also suffered as a result. Procedure costing was implemented based on averages and estimates from finance, so they were not trusted by clinicians and had little or no impact on clinical management decisions. It was also difficult to know whether reimbursement was covering the actual cost of procedures.



It wasn't possible to improve surgical practice by comparing the performance of different surgical approaches based on accurate information about inputs and outputs, because that level of information just wasn't available.

It was recognised that existing processes for tracking implants and other products to patients were inadequate, as had been clearly illustrated by the Poly Implant Protheses (PIP) silicone breast implant scandal. In addition, it was widely recognised that patient safety would be improved by being able to easily check that out-of-date products were not used on patients.

From the start, the intention was to find a solution that could be implemented across all theatres, and even beyond, into wards and clinics. And it was clear that barcodes were essential to collect the accurate, timely and comprehensive information needed to address these issues.

## Streamlining operations with standards

The initial goal was to electronically capture all equipment usage and implant information within the theatre, so it would be easy to trace all instruments and implants to patients. To do this, the Trust ensured that all products, staff, patients, surgical instruments and medical equipment were identified and scanned in the theatre at the time of the surgical procedure.

Since 2013, the Trust has been rolling out scanning at points of use, enabled by wristbands on every inpatient, backed up by a catalogue and scanning system that uses GS1 standards to enable:

- Scan and check inpatients. Each member of staff also has his or her own barcode.
- Track scopes/instruments to patients.
- Track theatre and stockroom consumption.
- Produce complete and accurate procedure costs, including staff time and decontamination charges.
- Generate replenishment orders automatically.



The information that GS1 barcodes gives makes for an accurate, automated process that reduces the need for manual intervention and the risk of human error. Derby started by scanning Global Trade Item Numbers (GTINs) on products, but quickly moved to scanning patients, staff and surgical instruments and their respective locations, using Global Service Relation Numbers (GSRNs), Global Individual Asset Identifiers (GIAs) and Global Location Numbers (GLNs), respectively.

Implementation consisted of integrating a cloud-based inventory management system, product catalogue and the barcode scanning solution. This was then all linked to a financial system for automatically creating orders—via EDI or email—to suppliers, based on the usage of products and supplies in the theatre. The system is delivered as a rental service and had minimal impact on theatre management and other internal hospital systems.

The products, staff, patient, surgical instruments and medical equipment are all scanned at the time of the surgical procedure to give a full record of the operation, including accurate timings for knife-to-skin actions and more. Information about the products used automatically updates stock levels and triggers orders, when necessary.

A record of the devices implanted into the patient is automatically available as well as a complete and accurate calculation of the procedure costs, by linking the products and instruments used, the number of and band of staff, and the time taken for the operation.

The OPCS and ICD-10 codes are also available to coders in real-time, which allows coders to request additional information, if required. The system has led to much closer co-operation between clinical staff and coders that, in turn, has led to further improvements. In addition, because the OPCS and ICD-10 codes from theatres are always available, they may be used to claim reimbursements, even if the full patient notes are unavailable.

**OPCS**, or more formally OPCS Classification of Interventions and Procedures is the procedural classification used by clinical coders within National Health Service (NHS) hospitals of NHS England, NHS Scotland, NHS Wales and Health and Social Care in Northern Ireland.

**ICD-10** is the 10<sup>th</sup> revision of the International Statistical Classification of Diseases and Related Health Problems (ICD), a medical classification list by the World Health Organization (WHO). It contains codes for diseases, signs and symptoms, abnormal findings, complaints, social circumstances, and external causes of injury or diseases.





## Significant financial and clinical impact

The changes have had a financial and clinical impact, including direct cost savings of £10,000 per month in just the general theatre through lower inventory and reductions in the number of orders and associated delivery costs, wastage and staff costs. Other benefits include:

- More accurate and detailed management information is now available.
- Non-stock spending has been reduced by 5 percent.
- Automation of processes means that clinical staff can spend more time with patients.
- Clinical support now assesses clinical practices in terms of costs, time and patient outcomes since the data is trusted and provided directly by clinicians.
- Improved information and co-operation with clinicians has resulted in identifying significant cost savings through simple process changes. For example, the move to purchase screws in sterile packages led to around £3,000 per annum savings in decontamination costs for trays containing screws. With over 1,000 trays identified as other potential trays to target and some of these are cleaned over a thousand times a year, this represents a significant savings.
- When recalls take place, the Trust can easily identify all products that are held within the Trust, preventing their use. It can also identify all patients that may have been affected by the products, even patients with implants who are

now at home, making it quicker and easier for required recall actions to take place.

- Scanning everything in the theatre also means that stock levels are automatically updated, triggering automated orders. And as equipment and implants are recorded against the patient, by also linking cost, staff and time information, a complete and accurate procedure cost is calculated.
- Since April 2014, the Trust has been saving at least £25,000 per month, just in the consumables being used in general surgery, imaging and catheter laboratories, for an annual savings of £300,000.

## Tracking patients and their records

Implementing GS1 standards is ultimately about patients—and every patient needs a barcode. Clinicians can now spend more time with those in their care, data is more accurate and the automation of theatre processes reduces human error.

Derby is planning to roll out the project to all wards and outpatient areas so it can fully map the patient's pathway throughout the hospitals. The Trust is working with GS1 UK to make sure that all implementations are GS1 compliant.

Work is also underway to see how barcodes for OPCS and comorbidity codes can be implemented using GS1 standards. The use of the Global Document Type Identifier (GDTI) and EPC-enabled RFID is under consideration for tracking physical patient records.

---

### About the Author



In April 2015, **Kevin Downs** was appointed Director of Finance and Performance at Derby Teaching Hospitals NHS Foundation Trust, having spent the previous three years at the Trust as Deputy Director of Finance. Previously, he worked at other NHS Acute providers, including Leicester, Milton Keynes, Northamptonshire and Hull, mainly in operational roles. Prior to joining the NHS, the majority of Kevin's career was spent in the commercial sector at Finance Director level. He is a Fellow of the Chartered Association of Certified Accountants and a Fellow of the Institute of Directors and has an MBA from Nottingham Trent University.

---

### About Derby Teaching Hospitals NHS Foundation Trust

Derby Teaching Hospitals NHS Foundation Trust provides acute hospital based health services, serving a population of over 600,000 people in and around southern Derbyshire. The Trust runs two hospitals: Royal Derby Hospital and London Road. The Trust also operates satellite services at other hospitals. The Derby Graduate Entry Medical School, on the Royal Derby Hospital site, is run in partnership with the University of Nottingham.

[www.derbyhospitals.nhs.uk](http://www.derbyhospitals.nhs.uk)



## Bedside scanning and patient safety

# Stryker's GS1 standards adoption journey

Stryker is one of the world's leading medical technology companies and offers a diverse array of innovative products and services in orthopaedics, medical, surgical, neurotechnology, and spine that help improve patient and hospital outcomes. Stryker is active in over 100 countries around the world.

*By Mary Beth Krantz and Shannon Pfau*



## Problem

The advent of the US FDA's Unique Device Identification (UDI) Final Rule and the NHS eProcurement strategy meant that Stryker, as with all other medical suppliers, needed to update their product labelling to comply with these new regulations.

## How was the problem solved?

Stryker saw this problem as an opportunity to standardise all of their product identifiers and barcodes. This approach makes life easier for their customers and increases efficiencies in the healthcare supply chain. Stryker recognised GS1 as the preferred standard for their customers and began implementation of GS1 standards across all 72,000+ Stryker products globally. This was a complex process, requiring hundreds of people, in multiple functions across all product and selling divisions.

---

An additional benefit of transitioning to GS1 standards, specifically GS1-128 linear or GS1 DataMatrix barcodes wherever possible, was to support a single scan on a product label.

The organisation first needed to identify the product data owners within the company, which was a vital step to ensure accuracy and consistency. Collaboration and consolidation of the information was required from:

- Regulatory (GMDN, authorized representative)
- Marketing (brand)
- Product development (dimensions, storage conditions)
- Supply chain (packaging level, unit of measure)

The Stryker teams developed sustainable business processes to harvest and consolidate these disparate product attributes into a new product master data system. This approach created one source of truth for Stryker product data.

Prior to the adoption of GS1 standards, the majority of Stryker products were labelled in production with HIBCC identifiers. An additional benefit of transitioning to GS1 standards, specifically GS1-128 linear or GS1 DataMatrix barcodes wherever possible, was to support a single scan on a product label. A phased approach was developed to introduce GS1 standards globally, making the transition more manageable. The first GS1 labelled products started shipping in September 2014 and the rest will be phased in over the next four years.

## What are the benefits?

By adopting the GS1 standard, Stryker anticipates there will be many benefits both internally and to their end customers, including:

- Help reduce medical errors caused by the incorrect identification of products
- Simplify integration of device usage information into computer data systems
- Facilitate faster identification of medical devices associated with adverse events
- Enable more efficient solutions to reported problems and resolution of device recalls
- Provide an easily accessible source of definitive device identification information
- Help detect counterfeit devices
- Improve inventory management and supply chain efficiencies
- Facilitate development of electronic patient records
- Help identify similar or replacement devices in case of a shortage

## Next steps

Stryker's implementation timeline is as follows:

Sept 24 2014	Class III (high risk) Medical Devices <b>61 Stryker products impacted</b>
Sept 24 2015	All Other Implantable, Life Supporting, Life Sustaining Medical Devices <b>21,351 Stryker products impacted</b>
Sept 24 2016	All Other Class II (critical) Medical Devices <b>17,000+ Stryker products impacted</b>
Sept 24 2018	All Other Class I (non-critical) Medical and Unclassified Devices - <b>30,000+ Stryker products impacted</b>
Beyond 2018 - remaining non-medical devices and products	



### About the authors



At Stryker, **Mary Beth Krantz**, Director, Data Governance and Master Data Management, leads enterprise master data

and governance strategies to support corporate-wide initiatives. This includes the process of data collection, maintenance and governance of product and customer Master Data Management as well as leadership in overall data governance policies across the enterprise.



At Stryker, **Shannon Pfau**, Manager, Training and Organizational Change, leads the communication,

training, and organizational change efforts to support corporate-wide initiatives. This includes ensuring comprehensive internal and external communication is taking place, required training is being developed and conducted, and facilitating organizational change principles throughout the initiatives.

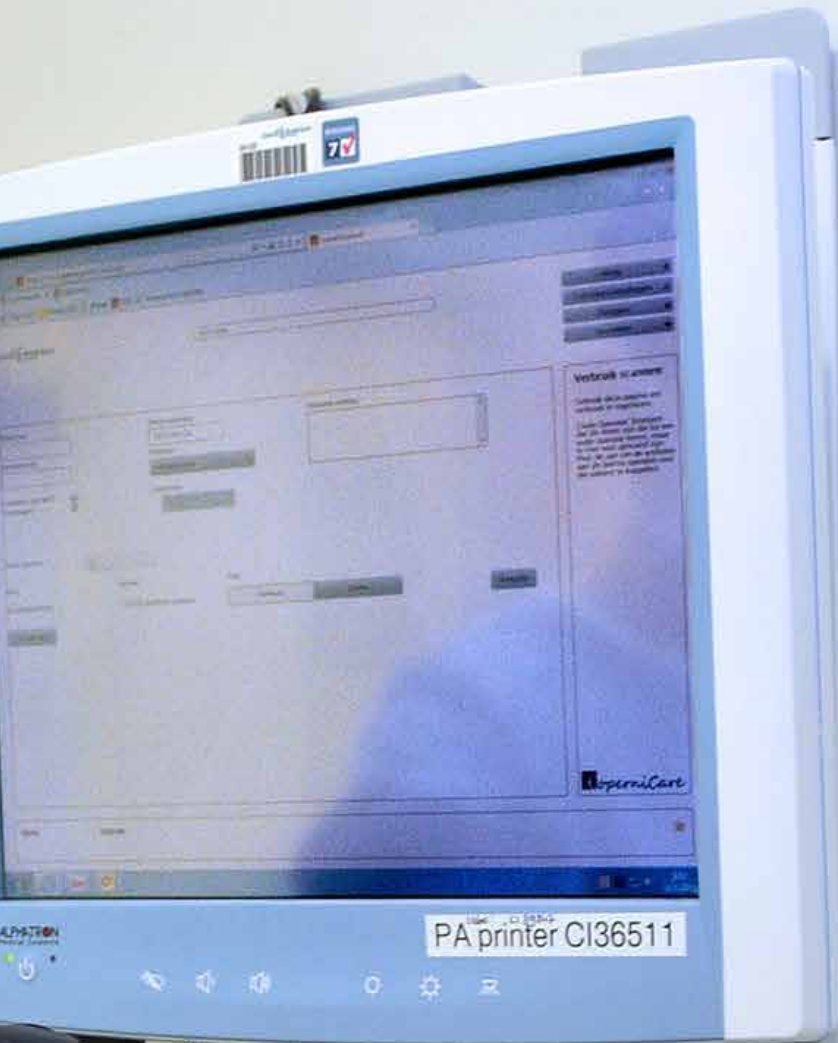
### About Stryker

Stryker is one of the world's leading medical technology companies and offers a diverse array of innovative products and services in orthopaedics, medical, surgical, neurotechnology, and spine that help improve patient and hospital outcomes. Stryker is active in over 100 countries around the world.

[www.stryker.com](http://www.stryker.com)







# Inventory management





Inventory management

# Valle del Lili improves patient safety with automated inventory management

The Valle del Lili Foundation (Valle del Lili) was founded on the principle of patient safety based on compliance with the five rights of medication administration—the right patient, the right drug, the right dose, the right route and the right time. The hospital continues to assure this level of patient care by continuously working to reduce risks and errors. With these goals in mind, Valle del Lili implemented an automated inventory management, using GS1 standards to uniquely identify and manage single-dose medicines and medical devices across its value chain.

*By Victor Lopez*

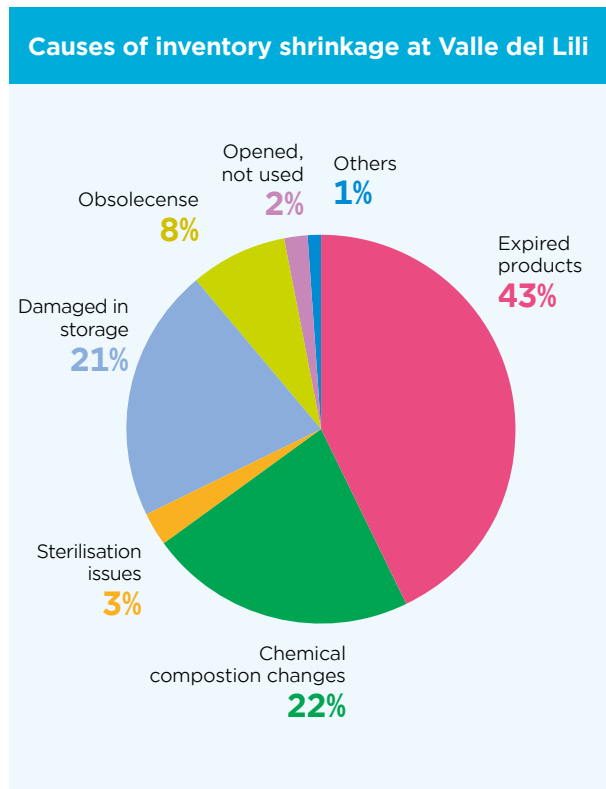


## Background

Located in Cali, Colombia, the 500-bed Valle del Lili Foundation provides healthcare solutions for its estimated 600,000 patients each year. Using the latest medical technology and cutting-edge healthcare practices, Valle del Lili is recognised as one of the most important hospitals in the region based on 2015 rankings published in *América Economía* magazine. For more than 20 years, the Valle del Lili Foundation has provided specialised healthcare services, ranging from preventive check-ups to cancer and cardiovascular care.

## Errors in inventory management

Valle del Lili took the lead to improve patient safety levels through the optimisation of supply chain administrative processes. Since 2001, Valle del Lili has implemented a Quality System certified by the International Organisation for Standardisation (ISO). In 2011, a new Enterprise Resource Planning (ERP) system was introduced to integrate the hospital's medical care and administrative processes. Yet, in spite of these advances, Valle del Lili was still using manual procedures that were prone to errors. In fact, 43 percent of errors were directly linked to inventory management issues related to expired products.





## Uniquely identifying medicines at the single-dose level

To minimise errors, Valle del Lili decided to automate its inventory management processes for medicines and medical devices. Now, a GS1 Global Trade Item Number® (GTIN®) with batch number and expiry date encoded in a GS1 DataMatrix barcode uniquely identifies each of its medicines and medical devices as they travel across the value chain—from receipt in the hospital’s warehouses to use with patients.

Four suppliers apply GS1 barcodes to 60 medicine types at the single-dose level. For products not identified and barcoded by suppliers, Valle del Lili re-labels these medicines at the single-dose level with a GS1 barcode to ensure compliance with the five rights of medication administration. Additional measures taken included the adoption of logistics best practices and the acquisition of the IT infrastructure to support the processing of collected information. Lessons learned during the implementation process involved the development of a change management process as well ensuring accurate and satisfactory operation of the handheld scanners.

The hospital made the inventory management and traceability solution a priority for enhanced patient safety.

## Ensuring patient safety and inventory efficiency

With GS1 standards, Valle del Lili now has a traceability solution that allows the hospital to improve operational efficiency and increase its competitiveness in providing healthcare services.

### Benefits include:

- **Validation of the five rights** of medication administration
- **50-75% reduction** in in obsolete inventory
- **15-30% reduction** in inventory levels
- **Effective recall process**
- **Ease of compliance** reporting of batch and due-date records to regulatory agencies
- **Easier and faster physical inventory procedures**, considering that all products stored in the warehouse are now identified with GS1 standards

### Project scope at Valle del Lili Foundation



Supply



Receiving process



Storage



Intrahospital distribution



Final dispensation

## Extending the use of standards to all suppliers

Even though Valle del Lili needed to invest in re-labelling medicines at the single-dose level, the hospital made the inventory management and traceability solution a priority for enhanced patient safety. Valle del Lili continues to work with GS1 Colombia, participating in its Collaborative Healthcare Group so that, as a second phase of the project, all of their suppliers will use GS1 standards as they arrive at the hospital.

---

With GS1 standards, Valle del Lili now has a traceability solution that allows the hospital to improve operational efficiency and increase its competitiveness in providing healthcare services.



Scanning the barcode of the medicine.

---

### About the Author



**Victor Lopez** is responsible for the supply chain management at the Valle del Lili Foundation. He has worked for this hospital located in Cali (Colombia) for over 17 years and has 26 years of professional experience in procurement management, demand planning, hospital logistics and corporate strategy. Victor Lopez holds a degree in industrial engineering and an MBA.

---

### About the Valle del Lili Foundation

Founded in 1982, the Valle del Lili Foundation provides healthcare solutions for its estimated 600,000 patients each year. The goals of this hospital are to strive toward excellence, achieved through continuous evaluation, quality improvement, and comprehensive services for the patients. A special team of doctors and nurses monitor the procedures and results of each of the patients admitted and treated at the Valle del Lili Foundation.

[www.valledellili.org](http://www.valledellili.org)



## Inventory management

# Greek Army Medical Supplies Centre standardises warehouse operations for decisive results

The Greek Army Medical Supplies Centre wanted to automate its warehouse processes and significantly minimise (or even eliminate) errors. After learning about GS1 standards, the Centre transitioned from using proprietary codes to GS1 Global Trade Item Numbers (GTINs), batch/lot and expiry dates encoded in GS1 DataMatrix barcodes on its own manufactured products as well as products from its suppliers. As a result, stock accuracy has improved to 96 percent, order fulfilment time has decreased by 25 to 30 percent, and the order error rate has dropped from 10 to 3 percent. With full visibility of products as they travel throughout the warehouse and to Army hospitals, the Centre can now execute faster recalls, if ever needed.

*By Sotirios Tsiafos-Tsiaras*



## Background

The Greek Army Medical Supplies Centre (Centre) is responsible for purchasing, warehousing and distributing pharmaceuticals and medical devices to Greek Army's regional warehouses and hospitals that serve active Greek Army personnel and their families. It also directly supports non-medical Army units and personnel deployed abroad at peacekeeping missions.

The Centre manufactures 35 pharmaceuticals with the remaining and all medical devices sourced from approximately 80 suppliers. During 2015, the Centre distributed more than two million items (approximately 1,500 unique SKUs) to its network of regional warehouses and hospitals.

## Standardisation as a top priority

Logistics Manager Sotirios Tsiafos-Tsiaras is responsible for all of the Centre's logistics processes—from the receipt of incoming products and management of stock, to the fulfilment of orders. All product data is recorded in the

Centre's ERP system; yet, its processes were once manual, time- and labour-intensive.

Manual processes—even with great care taken by warehouse personnel—were also prone to errors. This resulted in a host of issues in downstream processes such as incorrect orders, lengthy fulfilment intervals, slow responses to potential recalls and stock obsolescence.

“Our coding system was proprietary, yet we needed a global system that would allow us to better collaborate with our suppliers in case of a recall, as well as improve the efficiencies of our operations,” says Tsiafos-Tsiaras.

After meeting with a community of physicians, pharmacists and logisticians, Tsiafos-Tsiaras discovered the GS1 system of standards.

“Standardisation of our processes and coding was and still is a top priority for us,” explains Tsiafos-Tsiaras. “And the best way to achieve standardisation within our operations—in fact, within our industry—is to use GS1 standards that are open and available to all.”



As products arrive, warehouse personnel scan each carton's GS1-128 barcode to capture product information in the warehouse management system.

## A highly efficient operation with GS1 standards

Getting started, the Medical Supplies Centre called on GS1 Greece to learn more about the technical details of implementing standards. The Centre also engaged a software vendor to create a new warehouse management system (WMS) based on standards-driven requirements.

Now with GS1 standards, the Centre has automated its warehouse operations, from product receipt to order fulfilment. Products are uniquely identified with GS1 GTINs, batch/lot and expiry dates encoded in GS1 DataMatrix and GS1-128 barcodes.

For its own manufactured pharmaceuticals, the Centre assigns and uses GS1 GTINs encoded in GS1 DataMatrix barcodes at all packaging levels (e.g., packets, boxes, cartons). Yet Tsiafos-Tsiaras reports that suppliers are using GS1 standards on products in varying degrees. Therefore, for products arriving without barcodes, the Centre assigns and applies labels, mainly on cartons, with GS1 GTINs encoded in GS1-128 barcodes.

"Some, mostly multinational companies, use GS1 barcodes exactly as they should be used while others use national codes," explains Tsiafos-Tsiaras. "Others are not using standards at all, so as those products arrive we assign the GTINs and print the barcoded labels ourselves."

Each shelf in the warehouse has been assigned a unique ID, using a specific scheme. As products arrive in the warehouse reception area, Centre personnel scan their barcodes with handheld terminals to capture the product information in the WMS. As products are placed on shelves, the physical location barcodes are scanned.

"We know exactly which item and which lot is on which shelf," says Tsiafos-Tsiaras. "If stock is moved, we track its movement and new location by scanning both the previous and new locations' barcodes."

Upon completion of product receipt, the invoice is finalised for payment. "Receiving products is a much faster process now that in turn, helps us fulfil orders in less time."

## The exact products

As regional centres and hospitals issue orders, the WMS provides personnel with the exact location of each product in the warehouse, as well as its lot. Personnel are guided to follow a certain route for picking the ordered products, scanning the barcodes of each item and shelf that is then recorded in the WMS. "We scan the barcode of the shelf since we must be absolutely sure we are picking the right item, the right lot, from the right stock bin," says Tsiafos-Tsiaras.

By using different barcodes at each packaging level on its own pharmaceutical products, the Centre gains significant flexibility and productivity. "For example, we can scan a carton's barcode only once instead of scanning each individual item's barcode contained in the carton," explains Tsiafos-Tsiaras. "This not only saves our people a great deal of time, it also helps prevent errors."

Product obsolescence can now be easily managed, using the expiry data contained in the product's barcode along with the data in both the ERP system and WMS.

### Improvements in warehouse operations

**Stock accuracy** for fast-moving items improved

to **96%**,  
a 10 percent increase

**Improved productivity**

based on hours saved on order fulfilment and no need for reworks

**Order error rate** dropped from

**10 to 3%**

**Faster recall**

**response** rate based on traceability by product's lot/batch within the warehouse (and soon to regional warehouses)

**Order fulfilment time** reduced between

**25 to 30%**



“It is now much easier and quicker to locate products that are about to expire and move them to quarantine,” says Tsiafos-Tsiaras. “Furthermore, if a product is picked that has expired, our WMS flags the product as an error when scanned.”

---

“Standards help us function in a precise way that has made a significant impact on our operations, our hospitals and our patients.”

## Benefits were swift and positive

The new standards-based solution was implemented in phases, starting as a pilot for fast-moving medical devices and pharmaceuticals. Today, approximately 95 percent of all pharmaceuticals in the Centre are uniquely identified with GS1 standards and in the WMS, with plans to fully implement medical devices no later than June 2016.

Tsiafos-Tsiaras advises results have been swift and positive. After a year in operation, stock accuracy for fast-moving items has improved to 96 percent, a 10 percent increase. “At specific intervals each year, we conduct a stock counting,” explains Tsiafos-Tsiaras. “We calculate our stock accuracy by comparing our physical stock levels with the product and lot data in our WMS.”

Order fulfilment is now much faster, taking an estimated 25 to 30 percent less time, especially for larger orders. “It’s hard to calculate the exact impact that faster order fulfilment has on patient care, yet we can now respond much more quickly in case there is an urgent need by our hospitals to care for patients.”

And now with automated processes enabled by GS1 standards, order-related error rates have dropped from 10 to 3 percent within the first year.

“It’s reassuring to have full traceability of products within the warehouse at the lot/batch level,” adds Tsiafos-Tsiaras. “And in case of a recall, we can easily find the specific lot/batch of a product and remove it from our shelves. We also know which of our regional warehouses or hospitals received the recalled product lot. This can be done very easily and faster than ever before.”

## Full traceability in sight as next step

Tsiafos-Tsiaras is moving quickly to implement the same standards-based solution in the Army’s two major regional warehouses, enabling full traceability of pharmaceuticals and medical devices.

The next phase will include implementing GS1 EDI-based communication and transactions between centres for master data synchronisation, automated order processing, despatch advices and invoicing.

“Standards helps us operate in a precise way that has made a significant impact on our operations, our hospitals and our patients,” says Tsiafos-Tsiaras. “Everyone, especially our suppliers, should make using standards a priority.”

Tsiafos-Tsiaras also stresses the value of participating in the development of standards. “As healthcare providers and suppliers, we can together make our processes and industry much more efficient and safe for patients. It’s time to take the first steps.”

---

### About the Author



*Sotirios Tsiafos-Tsiaras is a Military Pharmacist with 20 years of experience in the healthcare supply chain. Currently the Logistics Manager at the Greek Army Medical Supplies Centre, he is leading the implementation of GS1 standards in the Army’s healthcare sector.*

*Tsiafos-Tsiaras holds a Bachelor of Science in Pharmacy and a Master of Science in Logistics and Supply Chain Management.*

---

### About the Greek Army Medical Supplies Centre

*The Greek Army Medical Supplies Centre purchases, warehouses and distributes pharmaceuticals and medical devices to the regional warehouses and hospitals serving active Greek Army personnel and their families. The Centre manufactures 35 pharmaceuticals with the remaining and all medical devices sourced by suppliers. During 2015, the Centre distributed more than two million items (approximately 1,500 unique SKUs).*



## Inventory management

# North Lisbon Hospital Centre optimises logistics for quality of care

The North Lisbon Hospital Centre wanted to optimise its logistics processes and more easily comply with the regulation requirements of INFARMED, Portugal’s government agency responsible for regulating all activities related to medicines and health products. As a first step, the logistics department assessed its suppliers’ use and associated quality of barcodes printed on medical devices and other products. Based on survey results, the North Lisbon Hospital Centre is now transforming its operations, working closely with suppliers to use GS1 standards that uniquely identify incoming products. To date, it has realised significant benefits for ease of compliance, traceability, improved productivity and reduced costs.

*by Nuno Loureiro*

CENTRO HOSPITALAR  
LISBOA NORTE, EPE



HOSPITAL DE  
SANTAMARIA



Hospital  
PulidoValente

## Background

In 2008, North Lisbon Hospital Centre (Centro Hospitalar Lisboa Norte or CHLN) was formed when two hospitals—the Santa Maria Hospital and Pulido Valente Hospital—came together. Today, CHLN plays a vital role of providing healthcare services with its more than 1,100 beds, 6,300 employees and 29,500 surgeries each year. Part of the University of Lisbon’s School of Medicine and Portuguese National Health Service, CHLN integrates pre- and post-graduate training into its operations and leads critical research and innovation initiatives.

## Innovation in logistics

At CHLN, its logistics services group also leads with innovative practices. Nuno Loureiro, Director of Logistics for CHLN, heads the team responsible for end-to-end management of 2,200 types of medical devices used by the hospital. As a logistics professional in healthcare, Loureiro fully appreciates how highly efficient processes can have a positive impact on patient care and safety.

“With the consolidation, we needed to find new ways to streamline our processes and control costs,” says Loureiro. “At the same time, we wanted to look for new ways to raise the level of service provided to our clinical services clients.”

“With GS1 standards, our ultimate goal is to achieve full traceability of products. In turn, we can help ensure safer care for our patients.”

A major goal for CHLN logistics included the adoption of global standards to help optimise the flow and processing of data along the supply chain and enable a much faster and accurate recall process. The department also needed to comply with INFARMED regulatory requirements for reporting the purchase and consumption of medical devices—as efficiently as possible.

“With GS1 standards, our ultimate goal is to achieve full traceability of products,” adds Loureiro. “In turn, we can help ensure safer care for our patients.”

## All barcodes are not equal

Taking a disciplined approach, CHLN structured its standards project to include five phases—from discovery to implementation. GS1 Portugal, working closely with CHLN, supported the project throughout all phases.

CHLN developed a structured project plan to assess the use of barcodes and support suppliers in the adoption of GS1 barcodes.

Starting in September 2014, the department approached 21 suppliers of medical devices and consumables, selecting 40 products based on their high turnover. Cartons as well as packages were analysed based on suppliers’ use of barcodes, the use of GS1 barcodes, and the accuracy of coding.

The results showed that 72 percent of analysed units had barcodes—81 percent of the cartons and 60 percent of the packages.

In addition, 81 percent of all barcodes were based on GS1 standards. Yet, only 18 percent of these GS1 barcodes were executed accurately and in compliance of GS1 requirements.

The results showed that

**81%**

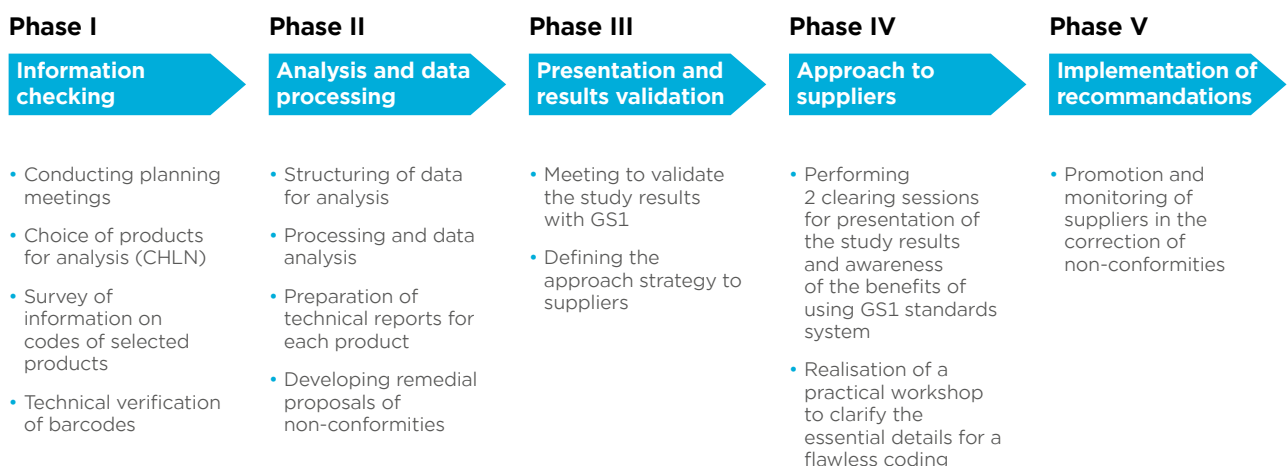
of all barcodes were based on GS1 standards.



## Project methodology



CHLN developed a structured project plan to assess the use of barcodes and support suppliers in the adoption of GS1 barcodes.



A unique Global Trade Item Number® (GTIN®) would be used to identify each item with the lot/batch and expiry date encoded in the package and carton's barcodes, which would then be scanned at the point of reception in the CHLN warehouse. Product data captured in the barcode would be used to identify the item as it traveled from warehouse storage to other supply locations, and ultimately to the patient's bedside.

**“The results from all surveys, confirmed our strategy to use GS1 standards—for the benefit of our hospital operations and in compliance with INFARMED regulation.”**

### Expanding discovery

CHLN decided to expand the survey to include all of its suppliers. Working with 133 suppliers, the project team analysed the use of barcodes on cartons and packages of 225 different items from four categories: medical devices, medical supplies (e.g., scrubs), dietary products and office supplies.

Results showed that 71 percent of products were labelled with barcodes and 80 percent of these were GS1 barcodes.

However, only 37 percent of these GS1 barcodes were accurately represented. Examples of non-compliance included: the batch numbers and/or expiry dates were not in the barcode; the expiry date was not specified in the human readable element; and the barcodes were not readable.

In parallel with this survey, another CHLN work effort analysed the use of GS1 standards for the traceability of cardiology medical devices. The sample size was extensive with representation of 750 types of medical devices from 15 suppliers. The vast majority—98.5 percent—of medical devices used GS1 barcodes accurately with GTIN, lot/batch and expiry date information provided.

“We were pleased but not surprised about the widespread and accurate use of GS1 standards,” says Loureiro. “Many of our medical device suppliers are U.S. and European companies that use GS1 barcodes in compliance with the U.S. FDA’s UDI regulation. The results from all surveys, confirmed our strategy to use GS1 standards—for the benefit of our hospital operations and in compliance with INFARMED regulation.”

### Transforming processes

Today, CHLN is taking steps to transform its logistics processes with GS1 standards. As medical devices enter the receiving area, barcodes are scanned to read each product's GTIN and other data. As medical devices travel from warehouse to clinical services to patients, they are tracked via scanning the GS1 barcode at each point.

“The ability to track and trace medical devices will significantly help us improve our recall process,” says Loureiro. “We have also adapted our IT system to match the GTIN with the national medical device code assigned by INFARMED in a one-to-one relationship. Now, we can more easily, and in much less time, generate the report that shows INFARMED our procurement and consumption of all medical devices.”

As part of its implementation, CHLN is also working with suppliers to create greater awareness of GS1 standards and provide training about how to properly use them. “GS1 helped us organise and educate our suppliers about standards,” says Loureiro. “I was personally involved in the training sessions with suppliers to communicate and stress the importance of using global standards.”

The response rate has been impressive with 47 percent of all CHLN's suppliers attending the sessions. As important, suppliers are now taking steps to make changes to accurately assign and apply GS1 barcodes on cartons and packages. “We will continue to work with suppliers since using standards delivers mutual benefits for us, them and our patients.”

The use of GS1 barcodes reduces stock level by

**20%**

for approximately

**€1.5**

million in inventory cost savings.



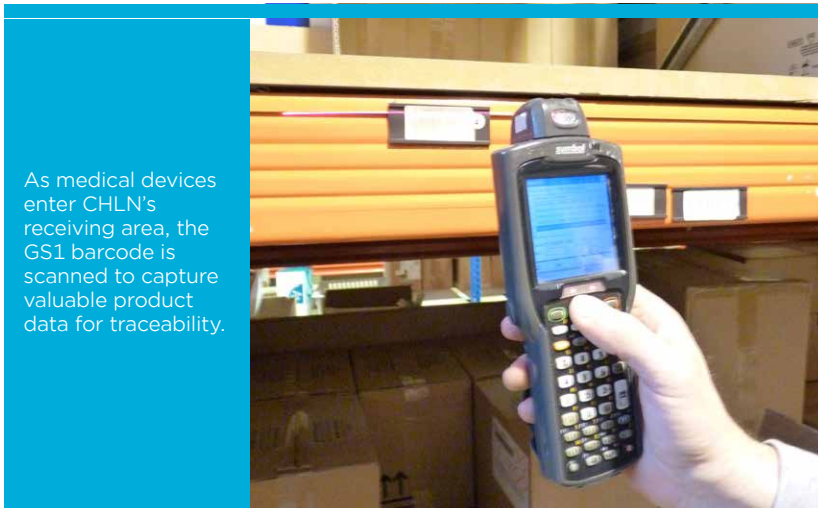
## Cost control with no compromise on quality

Automating the product receiving process has already produced tangible results for CHLN: time savings, productivity improvements, increased available product information and stock reduction.

The receiving process now takes 60 percent less time with instantaneous data capture via GS1 barcodes. This is an estimated potential savings of 49 days annually for warehouse personnel—time that they can redeploy for other strategic work. Since using GS1 barcodes, stock levels have also been reduced by 20 percent for approximately €1.5 million in inventory cost savings.

CHLN is also targeting increased efficiencies in its order-to-cash process along with a reduction in stock obsolescence. And as more and more product data is captured via GS1 barcodes, CHLN expects to significantly reduce—nearly eliminate—medical errors due to inaccurate or incomplete product information.

“Like many hospitals, we need to control our costs, yet we will not compromise the quality of care for our patients,” says Loureiro. “With GS1 standards, we can achieve both . . . at the same time.”



As medical devices enter CHLN's receiving area, the GS1 barcode is scanned to capture valuable product data for traceability.

“Like many hospitals, we need to control our costs, yet we will not compromise the quality of care for our patients. With GS1 standards, we can achieve both . . . at the same time.”

### About the Author



**Nuno Loureiro** is Director of Logistics at the North Lisbon Hospital Centre in Lisbon, Portugal. He is also a member of the Ministry of Health's Working Group that is implementing the methodology for the preparation of Sustainability Reports as part of the Global Reporting Initiative. Loureiro is a

member of the SiNATS forum, a discussion forum for medical device evaluation. He is a frequent guest speaker about logistics and operations management, warehouse management and hospital logistics as part of post-graduate studies in Biomedical Engineering of Technician Higher Institute and Health Services Management of Lusida University. Loureiro has published two articles in *Modern Logistics Magazine*: “Hospital Logistics in Context” and “Warehouse Centralization.”

### About the North Lisbon Hospital Centre

The Centro Hospitalar Lisboa Norte (North Lisbon Hospital Centre or CHLN) was created in 2008 when the Santa Maria Hospital and Pulido Valente Hospital merged. Today, the hospital provides a broad set of healthcare services with specialisations in cardiology, obstetrics, gynecology, oncology, neuroscience and more. With state-of-the-art facilities and 6,300 dedicated caregivers, CHLN performs an estimated 29,500 surgeries each year and cares for more than 43,000 out patients. Part of the University of Lisbon's School of Medicine and Portuguese National Health Service, CHLN integrates pre- and post-graduate training into its operations and leads critical research and innovation initiatives.

[www.chln.min-saude.pt](http://www.chln.min-saude.pt)



## Inventory management

# OLVG transforms its stock management system and culture of care

After analysing its levels of stock and associated waste, OLVG decided to make significant changes in its stock management system. Using the Lean Six Sigma managerial approach, OLVG centralised stock management practices across its multiple operating theatres. With GS1 standards uniquely identifying medical devices, the logistics team scans device barcodes to easily capture information such as batch/lot numbers and expiry dates for the hospital's stock system. As devices are used, barcodes are scanned to update stock levels. The stock monitoring system provides the team with products for re-ordering as well as products approaching their expiry dates. With the new system, OLVG has achieved full traceability of devices for highly efficient recalls, a 40 percent reduction in stock levels and significant savings in costs and wastage. And best of all, OLVG employees have peace of mind with complete confidence in their new standards-based system.

*By Margret Beliën, Ingeborg Wanrooij and Tanja Zenel*



## Background

The Sint Lucas Andreas Hospital and Onze Lieve Vrouwe Gasthuis merged to create one hospital called OLVG. With two locations in Amsterdam, the hospital has approximately 1,000 beds and 5,700 employees who care for approximately 500,000 patients each year.

During a 2013 audit in the operating theatres of Sint Lucas Andreas Hospital, the hospital discovered that it wasted a significant amount of stock. The stock management system was not efficient nor effective: There was no up-to-date information about stock levels and employees manually checked stock to determine if items had reached their expiry dates. As medical devices were used, they were registered on paper and scanned into patients' electronic medical records. And in the event of recalls, the process of locating impacted implants was labour intensive and time consuming.

**Lean Six Sigma** is a managerial approach that combines Six Sigma methods and tools and the lean enterprise philosophy, striving to eliminate the waste of physical resources, time, effort and talent, while assuring quality in production and organisational processes.

## A labour-intensive stock management process

To better understand the extent of the problem, OLVG counted all stock manually, which revealed a stock value of €1.4 million, the largest component being orthopaedic implants. At the same time, the level of waste was also analysed. In a three-month period, items worth €30,000 had been discarded and the expiry date had passed on at least 80 percent of items examined.

OLVG decided it was time to improve its stock management system. A business case was developed and, with agreement by the Board of Directors, the hospital started a project in 2014 to make all operating theatre medical devices traceable as part of a new stock management process.

Before commencing, the project team briefed operating theatre employees about its findings and the need for a new process. It soon became clear to them that change was needed. In fact, many of them said that, "If we were a supermarket, we would have gone out of business a long time ago!"

## Putting patients first with barcoding

The OLVG decided to adopt the Lean Six Sigma approach as its improvement method, with the specific structure being to define, measure, analyse, improve and control (DMAIC) for

organising quality and efficiency improvements that puts patients first.

One of the team's initial steps was to analyse the current stock management process to identify the problem areas. Based on the analysis, the OLVG team improved the process by simplifying it—removing steps that were not really needed.

In addition, new software was implemented to facilitate the scanning of barcodes on products, linking information back to the hospital's electronic medical record and inventory systems.

While the solution initially seemed straightforward (to scan as in supermarkets), the team quickly realised it wasn't. Many products used in OLVG operating theatres come from different suppliers, using different codes. Not all products had a GS1 barcode with the needed information such as the Global Trade Item Number® (GTIN®), batch/lot number and expiry date. Moreover, it was not clear to employees "which barcode" they were supposed to scan since some packages displayed multiple barcodes.

To make the scanning of devices easier for employees, it was decided to use recognisable yellow labels during the temporary labelling conversion process. The GTIN, batch/lot number and expiry data encoded in a barcode for each product was used on the yellow labels. Price information was added to the label to help increase employees' awareness about the cost of stock, thus promoting the need to conserve and not be wasteful.



By scanning the barcodes, OLVG can easily capture information about implants to keep stock levels up-to-date for improved stock management.



After implementing GS1 standards, the result is

**100%**

**traceability of medical devices** in the operating theatres.

OLVG is now rolling out GS1 standards in other departments.

OLVG also approached its suppliers about the value of using GS1 standards on their products with accurate information, complete with the GTIN, batch/lot number and expiry date. To date, approximately 60 percent of suppliers have complied. For the remainder of products, OLVG assigns and applies GS1 barcodes so that 100 percent of medical devices are identified with GS1 standards.

Today, by scanning the GTINs encoded in barcodes, OLVG can easily capture information about implants to keep stock levels up-to-date for improved stock management. The OLVG uses a customised and user-friendly stock monitoring system that provides employees with the products that need to be ordered and which products are approaching their expiry dates.

## Centralising stock management

Each specialised operating theatre was once responsible for ordering and managing its own stock. Now, a logistics team is designated to manage stock for all operating theatres with a focus on maintaining a highly efficient stock management process. To do this, the logistics team determine stock levels and orders based on the information they are able to generate from the stock monitoring system. This also means that operating theatre employees are able to fully concentrate on their patients.

To enable the effective management of critical items by the logistics team, the hospital examined the entire range of implants and disposables for each area of specialisation, creating an overview with linkages to minimum and maximum levels of stock. In turn, this effort led to the creation of an ordering plan for each department.

To generate support among employees, the project team showed employees how scanning works, while emphasising the responsibility and benefits it entails. If they failed to scan properly, records would then be inaccurate and stocks not replenished.

With increased awareness and understanding, employees were very enthusiastic about how scanning standards could benefit the hospital, its caregivers and patients. The departments were also positive and anxious to be part of the standards-based stock management system. Overall, the new process brought about real cultural change among the employees at OLVG.



A logistics team is designated to manage stock for all operating theatres with a focus on maintaining a highly efficient stock management process.

## Traceability, savings and peace of mind

The operating theatre stock management project has been a success, in terms of finance and patient safety results. By using GS1 GTINs, batch numbers and expiry dates encoded in GS1 barcodes, the hospital has achieved the following:

- **100% traceability**
- More than **€100,000 ongoing annual savings**
- **90% less waste** due to capturing the expiry dates; there are now minimal losses as a result of missed sterilisation dates.
- **Clear visibility** of stock levels
- **40% reduction in stock**
- **Automatic ordering** process
- **Shorter time intervals to process stock**
- **Improvements** in operating theatre logistics and collaboration with suppliers
- **Increased cost awareness** among employees
- **Uncluttered workspace** based on Lean Six Sigma principles

Thanks to the new system enabled by GS1 standards, the entire stock management process with traceability has become automated. All items subsequently used during treatments and operations are registered in the system, each under the relevant patient number. In the event of a recall, the hospital is able to determine, with the “push of a button,” which implant was used on which patient.

Moreover, less time is spent on recording information, while stocks remain up-to-date since replenishment recommendations are made upon scanning. There are also clear agreements on who is entitled to place orders. And because employees completely rely on the automated stock system, they now experience greater peace of mind. They are able to safeguard data using a simple and quick method, and since stock management is now in the hands of the logistics team, employees in the departments can focus on their work of caring for patients.

## Expanding GS1 standards throughout OLVG

The process has been rolled out across every area of specialisation. In addition, instrument trays are also being scanned. In the future, the hospital would like to scan other products, such as blood products and costly disposables.

Thanks to this new way of working, the hospital has achieved its target: to improve patient safety and stock management along with all of their associated benefits. In addition, it has led to a cultural change that has helped to de-stress the employees. Nonetheless, the OLVG still has one main wish: the use of GS1 standards throughout the healthcare sector.

### OLVG lessons learned

- Start with **one product** or type of department.
- **Start small** and grow.
- Select and involve **the right stakeholders**.
- Set **clear objectives**.
- **Communicate** the results.

### About the Authors



**Margret Beliën** is an operating theatre organisational manager at OLVG-West in Amsterdam, the Netherlands. In her role, she is involved with both patient care and logistical matters. She seeks to safeguard patient safety, to ensure that the department runs well, and

to create a pleasant working atmosphere for employees.



**Ingeborg Wanrooij** is an operating theatre business unit team leader at OLVG-West in Amsterdam, the Netherlands. She is also a Lean project manager at the hospital. Ingeborg is a member of the Dutch knowledge group, “Traceability in Healthcare,” which discusses and

deals with the traceability of medical devices and pharmaceuticals, with the aim of improving patient safety and raising efficiency. In addition to her position of team leader, she also assists other departments with the implementation of GS1 standards.



**Tanja Zenel** is a logistics employee at OLVG-West in Amsterdam, the Netherlands. She is involved with the logistics process, ordering and stocking implants in the operating theatres. Tanja is a member of the Dutch knowledge group, “Traceability in Healthcare,” and

is strongly motivated to further improve the logistics processes in the hospital.

### About the OLVG

The OLVG is a 1,000-bed city hospital in Amsterdam. A leading hospital where patients can go for all types of specialties, OLVG offers healthcare services from examinations and simple treatments to complex interventions. Patients are actively involved in their treatments and get assistance when making decisions. By conducting continuous research and training their healthcare professionals, OLVG takes an active role to provide better patient care for healthier lives. The hospital’s 5,700 employees, with “heart and soul,” care for 500,000 patients each year.

[www.olvg.nl](http://www.olvg.nl)



## Inventory management

# Cambridge University Hospitals implement GS1 standards to manage medical devices

Cambridge University Hospitals NHS Foundation Trust was challenged with tracking its mobile medical devices, spending unnecessary time to manually locate them while not focusing on their primary duties or, worse yet, not caring for patients. In addition, extra costly inventory was being kept on hand to serve the needs of the hospital. The Trust implemented GS1 standards to uniquely identify each device along with EPC-enabled RFID (Radio Frequency Identification) technology for tracking devices. Now, devices can be easily and quickly located, resulting in increased utilisation, availability of devices and improved patient care. Costs savings have also been realised. For example, tagging all ECG monitors has resulted in a capital cost savings of £175,000.

*By Simon Dawkins*



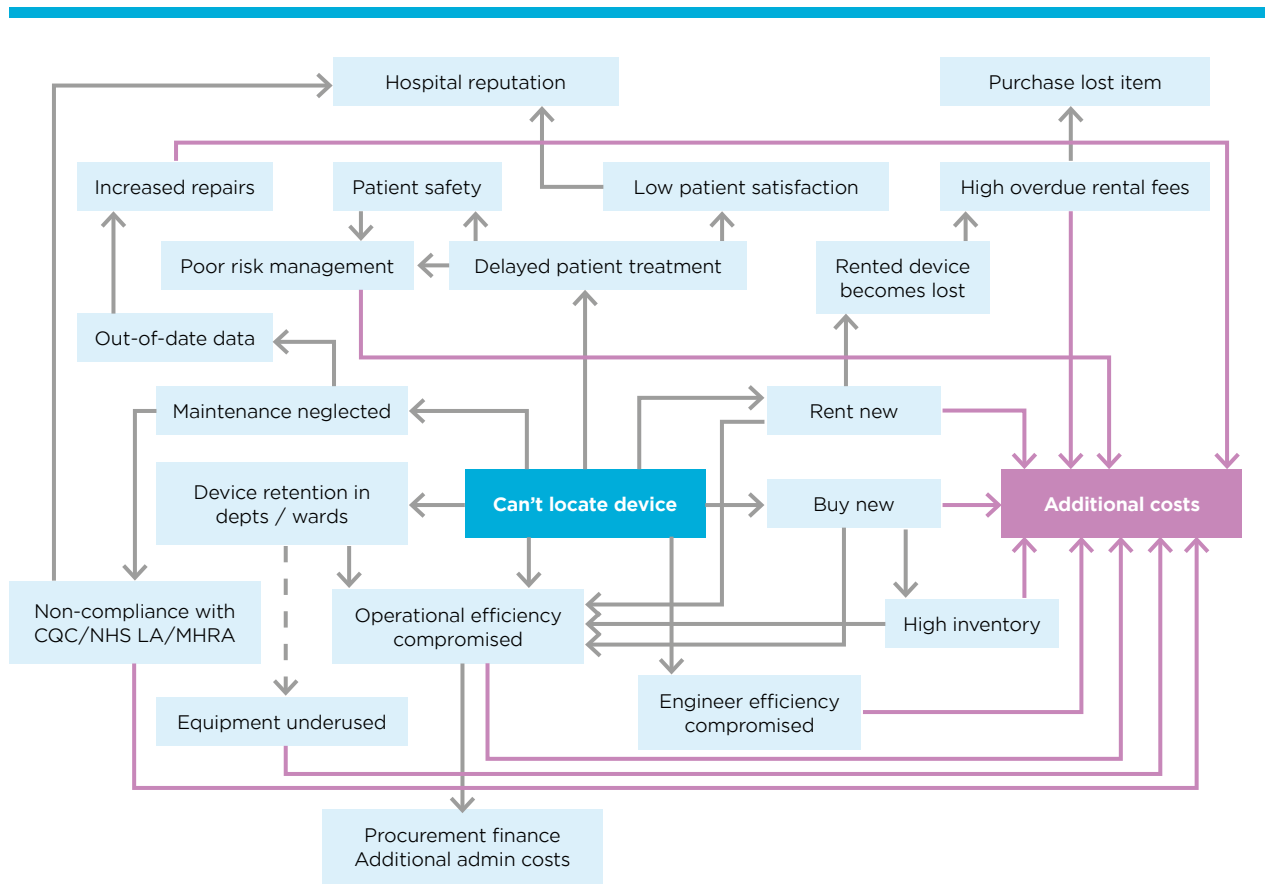
## Background

Cambridge University Hospitals NHS Foundation Trust (CUH) is one of the largest and best known Trusts in England. The Trust includes Addenbrooke's Hospital, which offers general and specialist care, and the Rosie Hospital, which provides maternity and women's care. As well as delivering care through the Addenbrooke's and Rosie hospitals, the Trust is also a leading national centre for specialist treatment for rare or complex conditions and is one of only five academic health science centres in the UK with a worldwide reputation.

CUH was the first hospital in the UK to introduce GS1 standards for the identification and tracking of mobile medical devices using EPC/RFID technology.

CUH was the **first hospital in the UK to introduce GS1 standards** for the identification and tracking of mobile medical devices using EPC/RFID technology.





The inability of the Trust to locate devices led to a host of issues that increased costs, lowered productivity and compromised patient care and safety.

### Time wasted on tracking devices

The Clinical Engineering team at CUH was challenged with tracking mobile medical devices, spending unnecessary time to manually locate and record each device—time that could have been spent on its core tasks of maintenance, repair and delivery of medical devices to the wards. The Medical Equipment Library team would also regularly spend hours (and walk miles) to locate specific devices.

This led to problems since the team was unable to confirm the number or types of devices allocated to wards or departments. Furthermore, the clinical staff would spend time looking for devices when they should have been spent time providing patient care.

Because equipment couldn't always be found, additional stock was held or ad hoc equipment purchased at short notice. In fact, new devices were regularly purchased unnecessarily to replace lost, misplaced and non-usable equipment. During a test audit, when applied to the entire Trust, the location of over £1 million worth of equipment was unknown.

The audit was also found to be less than 80 percent correct, and the amount of time taken meant the audit was not completed as required. The Clinical Engineering team soon realised that all these challenges were linked and could be addressed by automating the inventory tracking process.

In short, the inability of the Trust to locate devices lead to a host of problems that increased costs, lowered productivity and compromised patient care and safety.



A web-based application allows users to perform a location search to identify the last known location of a device.

## Easily locating EPC/RFID tagged devices

The Clinical Engineering team recognised that it could automate the process of tracking mobile medical devices using EPC/RFID technology.

In order to comply with GS1 standards, they decided to re-label and identify all 40,000 medical assets with a GS1 Global Individual Asset Identifier (GIAI). The labels contain the device's GIAI in both a GS1 DataMatrix barcode and also in a GS1-compliant EPC/RFID tag.

Medical engineers now travel throughout the hospital using a specially designed trolley fitted with powerful RFID readers to perform equipment searches and audit wards. With a read range of up to 11 meters, these trolleys automatically record the date, time and location of any tagged devices within range.

The team also has a small mobile handheld reader with a read range of six meters that it uses to perform specific equipment searches or to audit wards. This enables the team to capture asset location information quickly and efficiently. A web-based application then allows users such as nurses and engineers to perform a location search to identify the last known location of a device. History reports also show where an asset has been over a defined timeframe.

As of February 2016, a total of 16,000 assets had been fitted with the new GS1-compliant asset label.

## Improved tracking means improved patient safety

There has been a sharp increase in the number of devices the Medical Equipment Library team has been able to supply for a variety of different types. Increased utilisation and availability of devices has ensured the number available matches the number demanded, which supports improved patient care. For example, the supply of infusion pumps increased from 1,054 in November 2011 to 3,326 in March 2013.

Improved tracking of the movement of devices also provides all stakeholders with greater intelligence about device movement and use, providing vital management information for decision-makers at the Trust.

The use of RFID tracking and bringing all devices under the control of a central system highlighted a number of potential patient safety issues. For example, the emergency department once had specific settings on syringe drivers. This sometimes caused problems when these devices were moved to a ward with staff who were unfamiliar with these settings. Now, all 475 syringe drivers have a generic setting and the staff has been trained to use them.

Using EPC/RFID has also reduced the time it takes to audit wards. The average is now down from 90 minutes to just 8 minutes, enabling more effective use of engineers' time and allowing for more frequent auditing.

Introducing EPC/RFID tracking has also highlighted some surprising figures related to contractor performance. For example, by using the system, it identified that a medical device had been cleaned for only 1.5 minutes, a process that should have taken 7 minutes.

By using the system, it identified that **a medical device had been cleaned**

for only **1.5** minutes, a process that should have taken 7 minutes.



Location accuracy of devices has increased considerably, which means that those who need to find a particular device can conduct a search, using a web-based application on their local personal computer to save significant time.

Complaints from staff requesting devices have dropped dramatically and clinical staff now feels confident that they are going to receive a device when requested. The target for supplying a device to a ward is 30 minutes, yet the staff can now supply a device much faster in approximately 12 minutes. Increased confidence among clinical staff means that they no longer find it necessary to hoard equipment for their convenience—an issue that once exacerbated the problem of device availability.

#### Examples of cost savings include:

- Tagging all ECG monitors and moving their management under the Medical Equipment Library department's control has helped improve the use of existing devices, resulting in a lifetime capital cost savings of £175,000. The one-time cost of tagging all ECG monitors was just £16,000.
- The use of EPC/RFID tracking has highlighted issues with the management of hired devices, including specialised low-level beds. A first year savings of £99,441 was achieved by enabling staff to locate low-level beds for a timely return to the rental company as well as avoiding losing and having to replace rented beds.

## Expanding the solution to other departments

GS1 implementation for medical devices has saved the Trust time and money, and frees up time for the staff to focus on other work. Clinical staff members are more confident that they'll receive a device when they need it and the entire team has better information about equipment movement and usage, providing vital management information for decision-makers at the Trust.

The next stage in the process for CUH is to introduce GS1 Global Location Numbers (GLNs) to uniquely identify each location within the hospital, and to implement the system in other departments/sections within the Trust as part of the wider GS1 rollout within healthcare.

---

“Improved tracking of the movement of devices also provides all stakeholders with greater intelligence about device movement and use, providing vital management information for decision makers at the Trust.”

---

#### About the Author



**Simon Dawkins** is the Head of Medical Equipment Library in Addenbrooke's Hospital that is part of the Cambridge University Hospitals NHS Foundation Trust. His main role is to manage medical devices to support patient care and to ensure medical devices meet the needs of clinical staff and the Care Quality Commission, Medicines and Healthcare products Regulatory Agency and the NHS Litigation Authority. In the last four years, Addenbrooke's Hospital has been a leader in promoting ways to track and audit over 40,000 medical devices using GS1 standards and EPC-enabled RFID. To date, savings total over £750,000. Prior to working in the NHS, Simon worked for 20 years in retail.

---

#### About the Cambridge University Hospitals NHS Foundation Trust

Cambridge University Hospitals NHS Foundation Trust runs Addenbrooke's Hospital and the Rosie Hospital. Both are recognised as centres of medical excellence and innovation, and the independent Dr. Foster Hospital Guide ranks the Addenbrooke's Hospital as the safest in the region and the second-safest in the country. As an internationally known university teaching hospital, the hospital provides specialist services dealing with rare or complex conditions that need the most modern facilities, the most up-to-date treatment, and the best doctors, nurses, and clinical staff.

[www.cuh.org.uk](http://www.cuh.org.uk)





A close-up photograph of a pharmacist in a white lab coat working at a computer monitor in a pharmacy. The pharmacist's hand is visible near the monitor. The background is filled with blurred shelves of various medications. A solid blue rectangular box is overlaid at the bottom of the image, containing the text "Order to cash" in white.

Order to cash

## Order to cash

# Ramsay Health Care getting the benefits of using GS1 standards

Ramsay Health Care (Ramsay) wanted to improve the efficiency of its supply chain processes while leveraging Australian national eProcurement recommendations. To address this need, the health system has deployed a full suite of GS1 standards for identifying, capturing and sharing information to support interactions with its suppliers, including GS1 Electronic Data Interchange (EDI) standards. As a result, Ramsay has increased both the speed and efficiency of its purchasing processes, strengthened the efficient operation of its hospitals and helped ensure the continuous delivery of quality healthcare. In addition, procure-to-pay processing costs have decreased by approximately 95 percent per transactional document.

*By Andrew Potter*



## Background

In 1964, Ramsay Health Care was established by Paul Ramsay in Sydney, Australia, and has grown to become a global hospital group, operating more than 220 hospitals and day surgery facilities across Australia, France, Indonesia, Malaysia and the UK. It is one of the top five private hospital operators in the world. As of late 2015, GS1 standards-based EDI has been deployed with ten of Ramsay Australia's highest volume suppliers, and pilots are underway with five additional vendors.

Like many organisations in the healthcare sector in Australia, Ramsay Health Care supports the objectives defined within the National E-Health Transition Authority (NEHTA) supply chain program. Launched in 2005 with the goal to ensure a safe, secure and efficient health system that will deliver better health outcomes for all Australians, NEHTA recommends the use of GS1 standards, specifically the:

- GS1 Global Trade Item Number® (GTIN®) for the unique identification of products
- GS1 Global Location Number (GLN) for uniquely identifying facility and internal locations
- GS1 Global Data Synchronisation Network™ (GDSN®) as the foundation of the Australian National Product Catalogue (NPC)
- GS1 XML as the standard language used for EDI purchasing processes

“I could talk about improvements in accuracy, efficiency, standardisation and controls, but all those things can be summarised in two key benefits: We have saved time, and we have saved money.”

Procure-to-pay processing costs have decreased by approximately

**95%** per transactional document.





## Beyond the Australian national direction

Aligning with the industry-defined NEHTA's eProcurement recommendations was only one motivation behind Ramsay's work to deploy EDI. Having benefitted in the early 2000s from both organic and external growth, Ramsay needed to improve the efficiency of its supply chain and the accuracy of procurement processes by embracing new technologies and leveraging its size and buying power.

"With NEHTA and GS1 driving the change in the public system to eHealth and eProcurement, the choice to ride the wave was straightforward," notes Andrew Potter, Group Inventory Manager of Ramsay Health Care in charge of the EDI deployment project. "Furthermore, a significant acquisition had left our company with two incompatible ERP systems. The need for reform was clear."

The time was right to design and build all of the improvements Ramsay wanted, and to put in place the measures to align with NEHTA recommendations. This alignment with the whole of industry has helped support a solution where master data is controlled and properly protected from unwanted influence.



Every Ramsay facility—and every storage location within those facilities—has now been assigned a GLN.

## A collaborative effort

Getting activities up and running has been a team effort. Ramsay worked with GS1 Australia, SAP and its local EDI solution provider, Pacific Commerce, to build a system supported by standards that can handle increasing volumes of EDI transmissions and exchanges.

Every Ramsay facility—and every storage location within those facilities—has now been assigned a GLN. Suppliers undertaking EDI have also assigned GLNs for their operations. Products in Ramsay's SAP systems are synchronised with supplier data from the Australian NPC, sourcing data for each product against each GTIN assigned to all relevant packaging levels. Business messages are exchanged with suppliers using GS1 EDI XML standards containing the GTIN and GLN as primary identifiers for products and locations.

## A range of results

Ramsay is experiencing a wide range of benefits from its EDI deployment, as is every supplier with whom Ramsay has worked to implement EDI. The health system has achieved its goal of efficiency savings. Due to use of the NPC as the source of product master data and the foundation for EDI, improvements have been made in the accuracy of product information and prices.

Mr. Potter confirms, "Accurate product master data is the lifeblood of any business and accurate data was essential for our EDI implementation." Significantly fewer purchase orders are blocked or rejected. Furthermore, Ramsay teams are overall much more confident they are receiving what was ordered, and invoices are reliably paid as per trading terms. Hospitals have greater visibility of lead times, and Ramsay can more easily pinpoint issues where delivery times will not meet expectations.

Ramsay has also realised another important benefit from its efforts: The staff are now able to spend significantly less time on low- to no-value tasks like manually entering data, chasing payments or reworking mistakes; and as a result, they spend more time serving the needs of patients, clinical staff and hospital executives or resolving accounts with true issues.



“I could talk about improvements in accuracy, efficiency, standardisation and controls,” notes Mr. Potter, “but all those things can be summarised in two key benefits: We have saved time, and we have saved money.”

The cost to implement the GS1 standards and configure the EDI system was less than AUD \$100,000 and ongoing costs for use of an EDI service provider and GS1 memberships are approximately AUD \$25,000 per year. This means that based on an approximate manual procure-to-pay cost of AUD \$35, the cost from automated processing of purchase orders and invoices is reduced to approximately AUD \$2. Document volumes via EDI are expected to exceed a quarter of a million documents in 2016 so the savings should be significant.

## Lessons learned

Is your organisation thinking of deploying EDI?

Andrew Potter and his team at Ramsay have words of wisdom to share. For example, be sure that you and your team understand and can map all of the business processes you want to automate.

Build a solution for tomorrow, and not just for today; make it scalable to fit your future needs. Work with your suppliers using a “win/win” attitude since there must also be benefits for them in moving to EDI. This will support a successful implementation and mutual benefits.

And finally, Mr. Potter stresses the importance of having clean, high-quality master data before you even consider undertaking EDI. “For business, master data is just like the blood in your veins. It flows through every part of your organisation and through every business transaction. Master data is the lifeblood of your activity. It is the most important thing driving efficiency. So you need to care for the health of your master data just like you would care for yourself and your own health. Because if you don’t maintain your master data, then all your business processes will suffer.”




---

### About the Author



**Andrew Potter**  
is the Group Inventory Manager for Ramsay Health Care Australia and has been with Ramsay

for more than 10 years in hospital and corporate supply chain roles. Over his 20-year career in supply chain, he has also worked in small to medium enterprises such as medical device suppliers and scientific and life sciences suppliers. His primary focus at Ramsay is to deliver continuous improvement projects that deliver commercial benefit in the supply chain, with the EDI Implementation project being at the centre of his work programme. In addition, he manages the team that provides SAP master data management and delivers business support services to procurement, hospital supply chain and Australian executive stakeholders.

---

### About Ramsay Health Care

Ramsay Health Care is a global hospital group operating over 220 hospitals and day surgery facilities across Australia, France, Indonesia, Malaysia and the UK. It is one of the top five private hospital operators in the world and provides a broad range of healthcare needs from day surgery procedures to highly complex surgery, as well as psychiatric care and rehabilitation. With approximately 25,000 beds, the company employs over 60,000 staff across five countries and treats almost 3 million patients each year.

[www.ramsayhealth.com](http://www.ramsayhealth.com)



## Order to cash

# Optimising business operations with GS1 EDI business processes

In today's healthcare market, competitive pressure, regulatory requirements and new ways of working are demanding that manufacturers and retailers collaborate more. In 2013, Coopidrogas started implementing GS1 EDI transactions in order to optimise its members' business operations by lowering costs, increasing speed and improving accuracy and business efficiency. As part of its new process, Coopidrogas has adopted GS1 EDI-based documents such as purchase orders, shipping notices and receiving advices, and uses the Global Data Synchronisation Network™ (GDSN®) to update its master database.

*By Nazly Chacon*



## Background

Cooperativa Nacional De Droguistas Detallistas (Coopidrogas) is a non-profit association dedicated to the promotion of business improvements for independent pharmacies. It was created 46 years ago by a small group of independent pharmacy owners who, based on their small size and low-volume purchases, faced difficult negotiations with pharmaceutical suppliers, thus impacting their profit margins. Today, Coopidrogas has approximately 3,500 independent pharmacy owner members with 6,500 drugstores, representing approximately 41 percent market share in Colombia.

Stakeholders involved in the solution included pharmaceutical suppliers, Coopidrogas members of independent pharmacy owners and GS1 Colombia.

## The need for complete, accurate data

Coopidrogas has more than 20,000 products, 367 suppliers and six distribution centres that serve 614 locations in major cities, townships and remote villages.

To maintain a lean and efficient supply chain, Coopidrogas faced three main challenges:

- Keep product information up-to-date in order to facilitate the flow of information between the independent pharmacies.
- Ensure the quality of data in order to support the implementation of technology and GS1 EPC-enabled RFID (EPC/RFID).
- Decrease the time dedicated to product coding by using EDI transactions for lower costs and faster time-to-market intervals.

## Improving information flow across the value chain

The project developed by Coopidrogas focused on the implementation of GS1 standards and business-to-business (B2B) commerce based on GS1 EDI standards, to include product data synchronisation as well as electronic transactions like purchase orders, shipping notices and receiving advices. Designed to reduce time to market and guarantee data quality, the new solution aims to improve the information flow across the Coopidrogas value chain.

The solution was based on the following goals:

- Adopt GS1 standards using the GS1 Global Trade Item Number® (GTIN®), Global Location Number (GLN) and GS1 EDI technical specifications.
- Align commercial and logistics processes based on information received from B2B commerce with suppliers.
- Develop partnerships with companies that offer B2B-commerce services for an efficient way to engage suppliers.
- Connect to LOGYCA / SYNC, the GDSN-certified data pool in Colombia.
- Collaborate with the pharmaceutical industry through GS1 Colombia with the aim of defining basic criteria to provide accurate information and training to different stakeholders.

---

Accuracy of purchase orders has increased from 92.9 to 96.4 percent in the first four months after the GS1 EDI implementation.

## Accurate and complete data for all stakeholders

Stakeholders involved in the solution included pharmaceutical suppliers, Coopidrogas members of independent pharmacy owners and GS1 Colombia.

- In the pharmaceutical industry, Coopidrogas has 367 suppliers (laboratories). Participation and commitment from these suppliers is critical since they are the main producers of information and have the required knowledge about pharmaceutical products to ensure they are marketed correctly.
- The estimated 6,500 drugstores are benefiting, thanks to improvements based on the implementation of best practices in logistics that enabled them to receive products on time, reduce out-of-stock situations and improve profit margins.
- GS1 Colombia provided a neutral meeting place for the development of the collaborative initiatives based on global standards and the introduction of best practices in logistics. Coopidrogas is part of the GS1 Colombia Healthcare Group that brings together the main players in the country's healthcare sector in order to make the healthcare value chain more efficient, flexible and competitive in areas such as data quality and the traceability of medicines. Pharmacies now collaborate with suppliers to monitor stock management indicators such as out-of-stock and service levels.

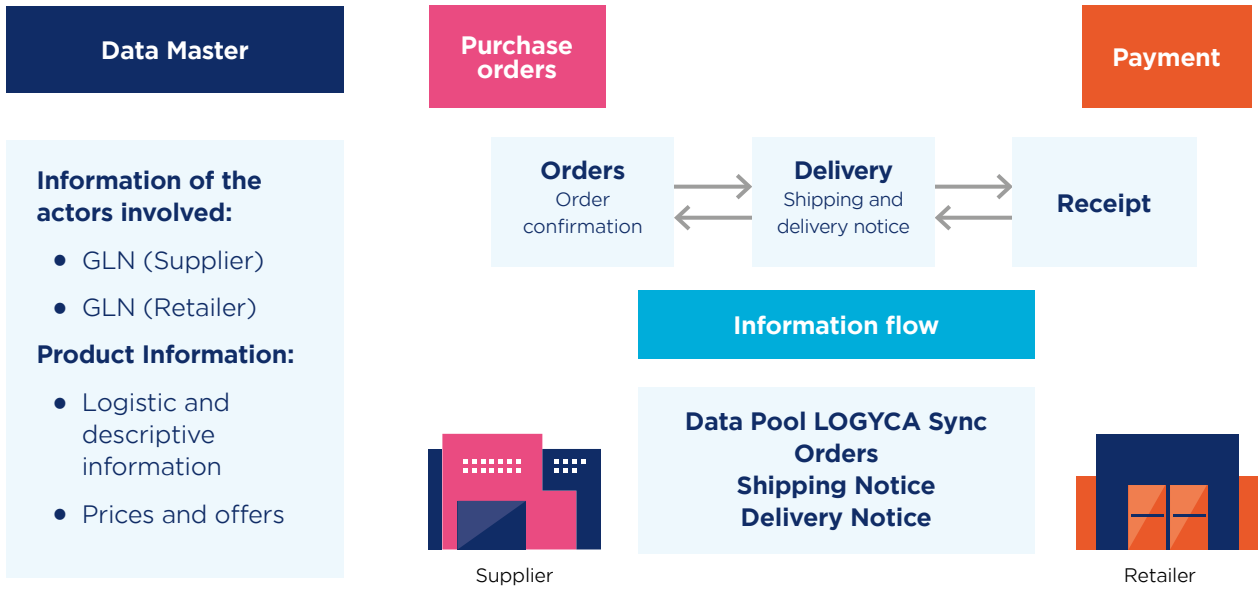
To date, achievements include:

- Technical information about the product is accurate and complete. More than 90 percent of Coopidrogas' products are synchronised through the LOGYCA / SYNC data pool.
- There is perfect alignment of the master data between suppliers and retailers. During 2015, 70 percent of the products were synchronised using different GS1 EDI messages.

GS1 EDI	% OF SUPPLIER IN OPERATION
Price Catalogue (PRICAT)	44%
Purchase Order (ORDERS)	88%
Despatch Advice (DESADV)	100%

- Accuracy of purchase orders has increased from 92.9 to 96.4 percent in the first four months after the GS1 EDI implementation.

# Information flow



## Traceability using EPC/RFID technology as next step

Using EDI-based transactions is an efficient way to optimise business relationships; however, there is an inherent dependence on the accuracy of information shared, making it imperative to support the process via collaborative work with suppliers based on GS1 standards.

For Coopidrogas, the EDI implementation is a starting point to ensure the traceability of medicines through the value chain. Since 2014, Coopidrogas has been implementing traceability processes based on EPC/RFID technology for private brands. Currently, this project is in the stabilisation phase with the next step is to expand the use of this technology to other products marketed in Coopidrogas.

### About the Author



**Nazly Chacon** is the Director of Business Support Technology at Coopidrogas with 20 years of experience in the retail sector. Nazly is an Industrial Engineer with specialisation in Logistics Management.

### About Coopidrogas

Cooperativa Nacional De Droguistas Detallistas or Coopidrogas is a non-profit association dedicated to the promotion of business improvements for independent pharmacies. Created 46 years ago by a small group of independent pharmacy owners, Coopidrogas today has an estimated 3,500 independent pharmacy owner members with 6,500 drugstores, representing approximately 41 percent market share in Colombia.

[www.coopidrogas.com.co](http://www.coopidrogas.com.co)





## Order to cash

# Using GS1 standards to improve EDI accuracy and achieve the perfect order

In 2011, Becton, Dickinson and Company (BD), Mercy Health (Mercy) and its supply chain company, Resource Optimization & Innovation (ROi), launched a collaborative initiative to fully automate their order-to-cash process to achieve the “perfect order,” implementing GS1 standards from manufacturing site to patient bedside. This end-to-end integration of global data standards—in supply chain and clinical processes—by a healthcare manufacturer and provider is a first-time accomplishment in the U.S. healthcare industry. Moving forward, the trading partners have continued to perfect and extend their perfect-order success, resulting in highly accurate and efficient processes with a continual focus on improving patient care. This review will provide an update on how the two organisations implemented EDI to achieve supply chain efficiencies and how their use of GS1 standards continues to evolve.



*By Dennis Black and Matthew Mentel*

### Adopting a phased approach

Today’s U.S. healthcare industry faces many challenges such as increasing regulations, new demands from patients and rising costs.

For healthcare providers and manufacturers alike, the supply chain holds considerable opportunity to better control and reduce accelerating costs by addressing a major contributor—errors.

To eliminate transaction errors, BD and ROi/Mercy took a phased approach to implement GS1 standards, enabling automated EDI transactions to reduce human intervention in their procurement and replenishment processes.

“Achieving the perfect order has helped us become a more efficient business partner, streamline our internal procure-to-pay processes and enabled us to provide better care for our patients,” explains Matt Mentel, Executive Director, Integrated Performance Solutions with ROi/Mercy. “In addition, through this work we have helped our own operations by reducing redundancies and the overall cost of doing business.”

### What makes an order “perfect”?

Defined by the Strategic Marketplace Initiative (SMI), the perfect order is “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.

Dennis Black, BD's Director of e-Business, Solutions Group, adds, "Over the past few years, we have continued to look for new opportunities to leverage GS1 data standards in our business processes. We continue to realise new benefits as our experience and network of partners grow."

## Taking first steps with identification

For ROi/Mercy, the decision to use GS1 standards was a straightforward one. As Mercy's supply chain company, ROi fully understood how improved supply chain processes could have a positive impact on clinical operations.

For example, Mentel stresses the importance of having accurate product data for consumption at the point of care by clinicians.

"Having and using GS1 standards enables us to automate the scanning and documenting of product at the point of consumption, while also automating the replenishment of that product back to inventory. This removes the burden of manually tracking product consumption and replenishment from our clinicians and allows them to focus on their patients, knowing the right products will be available at the right time and place."

The transformation started with BD assigning GS1 Global Trade Item Numbers (GTINs) to uniquely identify its products and Global Location Numbers (GLNs) to identify its locations. Subsequently, ROi assigned GLNs for its distribution centres and Mercy hospital locations, sharing these GLNs with BD and other suppliers to ensure shipments were delivered to correct locations and traceability records are fully aligned.

Black advises, "From the beginning, we decided that we would only use GLNs assigned by our respective trading partners. If we want accurate location data on Mercy Health and ROi/Mercy, we need to use their interpretations, not the work of a third party. Accurate GLN assignments can help us reduce pricing and shipping errors."

## Enabling seamless EDI transactions

When ROi/Mercy and BD first began working to establish the perfect order, both companies worked to ensure that every BD product had an established GTIN for every item in Mercy's item master at each unit of measure. Today, ROi leverages these GTINs when ordering, picking and shipping BD products throughout Mercy.

Where applicable, Mercy also uses GTIN data to scan products at the point of care and to store product usage information in the patient's electronic health record (EHR) and registries.

BD and ROi/Mercy also use GS1 standards in their EDI transactions for the instant exchange of business transactions for improved efficiencies and accuracy throughout the order-to-cash process.

By transitioning from manual data entry to automated, EDI-driven processes, both trading partners have realised a wealth of benefits such as significantly improved accuracy, reduced costs, increased product availability and improved productivity.

"Adopting and leveraging GS1 standards across the healthcare industry is essential, providing us improved efficiencies in our supply chain operations and affording us the ability to continue to improve the patient experience."

Gene Kirtser, CEO, ROi

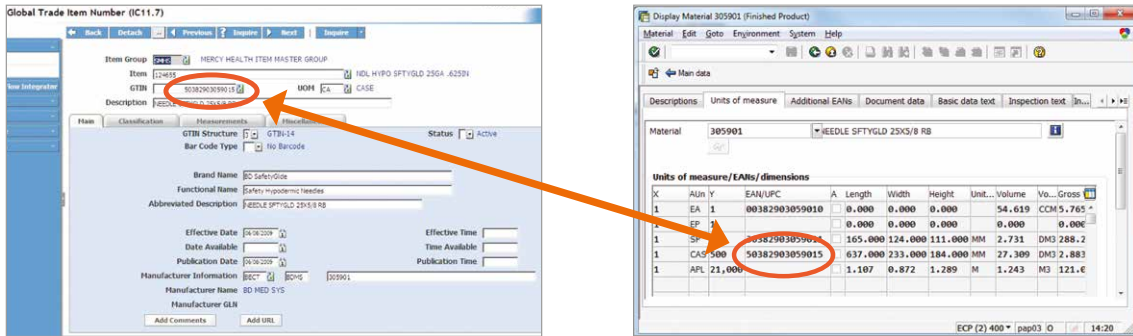
In December 2015,

**97.64%** of BD products purchased by ROi were via EDI and

**96.46%** of the line items were "touchless," accounting for some items that require human intervention as part of the fulfilment process.

The effective error rate during this month was an impressive

**1.18%**, considering that EDI transacted orders can fail for a variety of reasons.



Aligned Master Data

BD and ROi/Mercy began transacting via EDI long before they began using GS1 data standards. The use of GLNs and GTINs in EDI transactions has created further efficiencies and enabled the two trading partners to speak the same business language. Both have the exact understanding of the data represented by a specific GLN or GTIN.

The value of EDI is evident based on its growing use by companies worldwide. In its 2015 EDI implementation survey, GS1 found the implementation of GS1 EDI standards—GS1 EANCOM® and GS1 XML—by responding member companies has continued to show steady growth for the past 10 years.

“BD uses EDI transactions for more than 90 percent of our sales volume in the U.S. region,” says Black. “EDI is an efficient process for purchase orders, advanced ship notices (ASNs), invoices and other procurement transactions. We have worked with Mercy Health and other leading healthcare providers to use GLNs and GTINs in EDI transactions. The use of data standards in EDI transactions can help to reduce master data errors and add to the efficiency of using EDI.”

### Gaining accuracy and visibility of orders

When placing an order, ROi/Mercy uses the GTINs on purchase orders (POs), which takes the guesswork out of ordering the right products.

“GS1 standards provide a common language for our EDI transactions, directly impacting data quality,” says Mental. “The GTINs associated with BD products in our materials management information system (MMIS) match the data in BD’s ERP system. We no longer confuse levels of packaging or have errors due to the use of internal product numbers.”

Each BD product’s GTIN with lot/batch and expiry data is encoded in a GS1 barcode, which is printed on the product’s package label in BD factories. As orders are assembled for shipping, the BD distribution centre uses the GS1 Serial Shipping Container Code (SSCC) to identify a single logistic unit and its contents. A Global Shipment Identification Number (GSIN) is also used to quickly identify the shipment and access the groups of logistic units that are included. In application, the pallet is coded with an SSCC license plate label, which provides a common means to identify pallets across partner’s systems and a link to their contents using the product GTINs. The pallets are then shipped, identified with the GSIN that can be encoded to allow for instantaneous access to the shipment information. With GS1 standards for products, logistic units, shipments and EDI communication, the trading partners have the needed foundation for seamless and error-free transactions.

BD is also experimenting with publishing and managing their product data in the GS1 Global Data Synchronisation Network™ (GDSN®). “We currently use several different methods to share product data with ROi/Mercy and other customers. We are now experimenting with GDSN to provide product data in a trusted and secure way for any product a hospital consumes,” says Black.

As a shipped order travels from a BD factory to its distribution centre, it then moves on to the ROi/Mercy distribution centre and eventually gets distributed throughout Mercy. Through this process, ASNs containing the GTINs and GLNs are used to verify the receipt and accuracy of the order, providing visibility of the shipment and its products, each step of the way.

Upon receipt, the ROi/Mercy distribution centre scans the shipping label to verify receipt of

products included in the shipment and record the product information in its inventory system. From there the product is distributed to the facility where the GTIN is scanned to the shelf and made ready for consumption. As a result, quality control processes are improved through this workflow as ROi/Mercy can use the manufacturer-provided production data for managing inventory. With immediate access to accurate information, this speeds both the BD and ROi/Mercy supply chain processes and helps ensure overall accuracy of orders.

### Ensuring the chain of custody

When shipping products to any of its hospitals, the ROi/Mercy distribution centre transmits an ASN to the Mercy location receiving the shipment for ease of product receipt and verification. As products travel throughout Mercy's hospitals, their GTINs enable ROi to trace products from points of replenishment to points of use.

Where applicable, ROi/Mercy uses GTINs to track products for use in its procedural areas, pharmacies, storage locations and patient care areas. GTINs can also be scanned to help search for products in Mercy's materials management information system.

Caregivers scan patient wristbands to identify the patient and location where care takes place. They can also scan GTINs on consumed products, capturing critical information to drive product consumption, near real-time usage and inventory control as well as patient invoicing.

As products are consumed in Mercy facilities, a replenishment order/PO is generated with the needed product GTINs as well as the GLN of the hospital where the products should be shipped. The PO is automatically transmitted via EDI to the ROi/Mercy distribution centre where products are picked and shipped.

Mentel advises, "Scanning and tracking of a GTIN throughout the supply chain and on to the point of consumption is key. The scanning of the GTIN allows us to manage and remove the risk of an expired product being used at the point of care. In addition, once GTINs are more extensively used in recalls, we will also be able to leverage this same scan to remove the risk of recalls being used on patients, accurately track the recalled product to the patients who received it and trace it back to the supplier who sourced it. GS1 standards also help us confirm the authentication of products received, verifying their chains of custody."

Patient	OR Procedure Name	Supply Item Type	EPIC Supply Item Name	Manual Cd	Item Nbr	Part Nbr
E1402260637	APPENDECTOMY	Basin	BASIN SURGI-START SGL 31144333	TYCI	120224	31144333
E1402260637	APPENDECTOMY	Catheter	CATH FOLEY 16FR TRAY 900016A	CRBA	77894	900016A
E1402260637	APPENDECTOMY	Lab	BACTISWAB AEROBIC C/S RT23115	ATC	181335	R23115
E1402260637	APPENDECTOMY	Lab	CULTURETTE SPECIMEN ANAEROBIC	BECT	120666	40392902365006
E1402260637	APPENDECTOMY	Laparoscopic	ENDO CATCH 10MM 1730500	TYCI	259427	1730500
E1402260637	APPENDECTOMY	Laparoscopic	SPNG ENDO KITTNER 13300	WICN	207726	13300
E1402260637	APPENDECTOMY	Clip	APPLIER ENDO CLIP II 1-USE W/MED-L	TYCI	268114	176657
E1402260637	APPENDECTOMY	Dressing	DRSG BANDAID 0.75X3" 3065LF	TYCI	42376	3065LF
E1402260637	APPENDECTOMY	Dressing	DRSG OZE 4X4IN 10PK 2539	TYCI	182350	2539
E1402260637	APPENDECTOMY	Glove	GLV SURG BIOGEL 6.5 30465	MOLN	13319	30465
E1402260637	APPENDECTOMY	Glove	GLV SURG BIOGEL 8.0 30480	MOLN	9928	30480
E1402260637	APPENDECTOMY	Gown	GOWN SURG ULTRA-XLG 95121	KIMB	4140	95121
E1402260637	APPENDECTOMY	Lab	BACTISWAB AEROBIC C/S RT23115	ATC	181335	R23115
E1402260637	APPENDECTOMY	Lab	CULTURETTE SPECIMEN ANAEROBIC	BECT	120666	00392902365006
E1402260637	APPENDECTOMY	Laparoscopic	ENDO CATCH 10MM 1730500	TYCI	259427	1730500
E1402260637	APPENDECTOMY	Laparoscopic	SPNG ENDO KITTNER 13300	WICN	207726	13300

Use of BD GTIN Data in a Mercy Health Electronic Health Record

"BD is investing in product master data, applying accurate barcodes to our labels, and perfecting business processes so that we can better serve our customers. This work is an example of the offerings included in our Signature Solutions program where we are offering up resources and expertise to further collaborate with our customers."

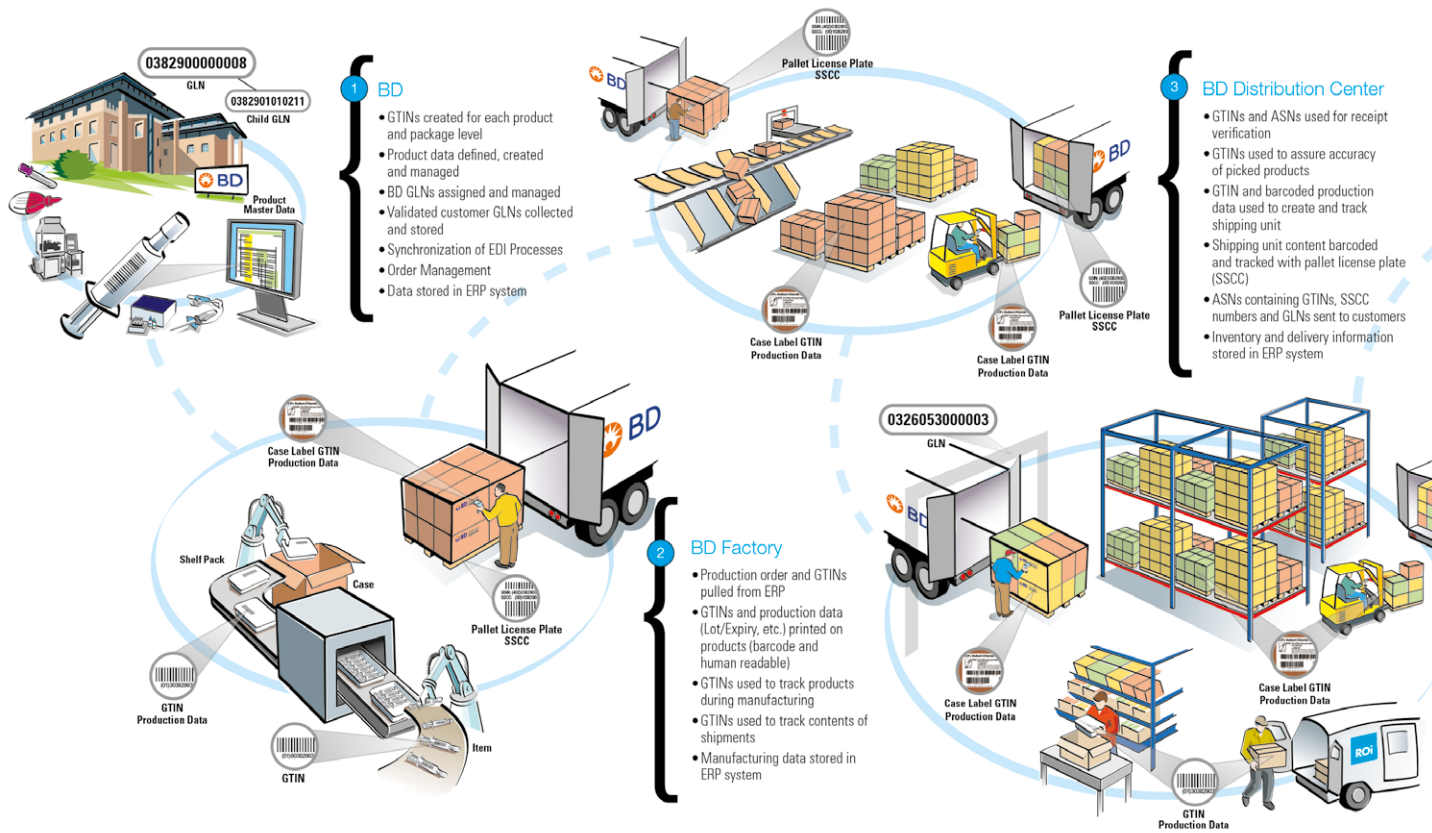
David Ortiz, Director, Solutions Group, BD

"To be successful with EDI transactions, we need to align master data, agree on business rules, select a common EDI format and manage many other variables. By synchronising product master data using GLNs and GTINs with our customers, we can enable our ERP systems to speak a common business language and help eliminate EDI errors."

Carol Harrison-Bradley, Manager, e-Business, BD



## End-to-end integration: GS1 global standards go where the product goes



## Perfect order for improved patient care

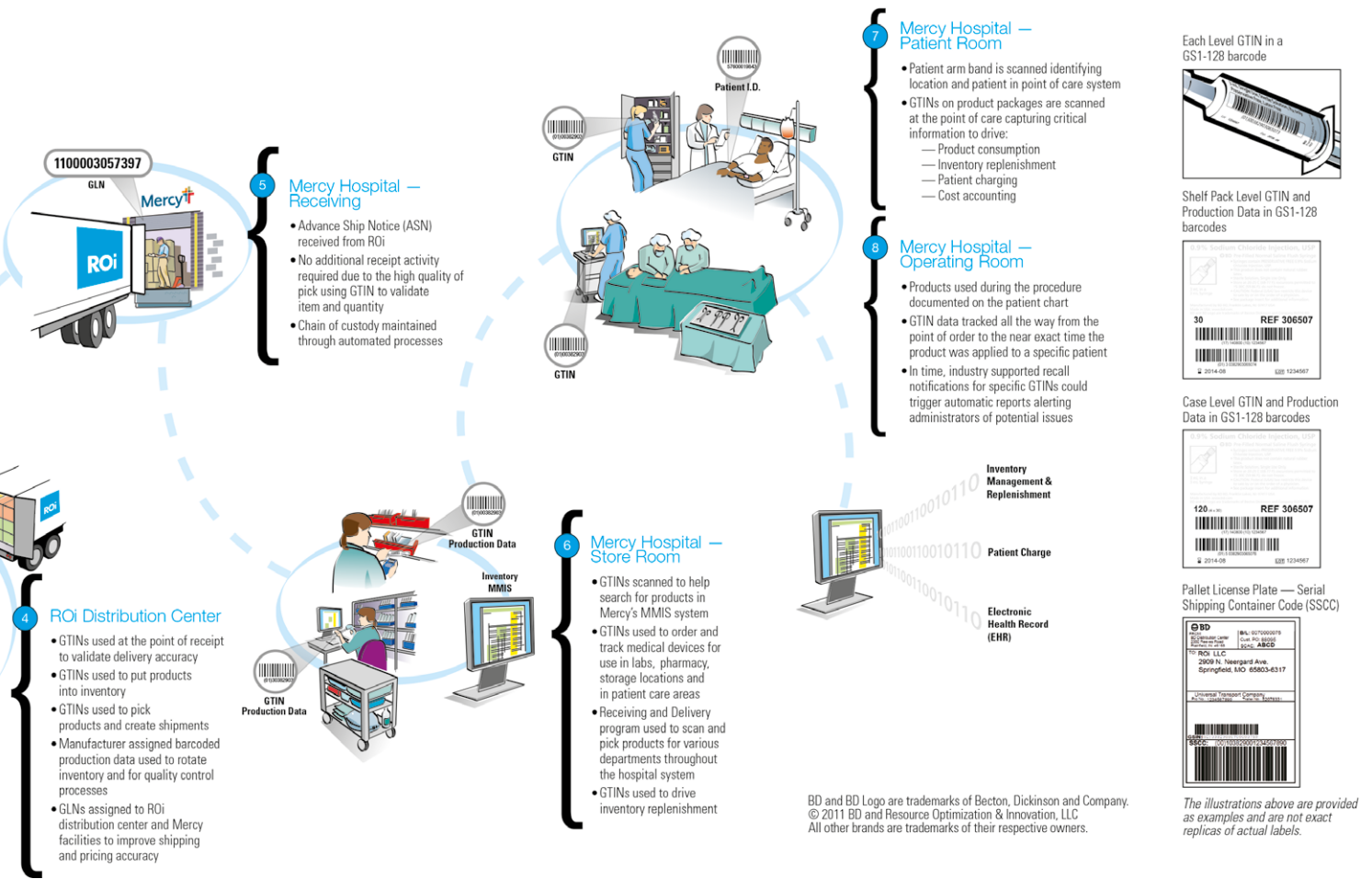
Three years after instituting the Perfect Order programme between BD and ROi/Mercy, EDI utilisation remains high and error rates remain very low.

In December 2015, 97.64 percent of BD products purchased by ROi were via EDI and 96.46 percent of the line items were “touchless,” accounting for some items that require human intervention as part of the fulfilment process.

The effective error rate during this month was an impressive 1.18 percent, considering that EDI transacted orders can fail for a variety of reasons. This continually high EDI success rate has been achieved without expending significant resources. To maintain a high EDI success rate, the trading partners continue to share master data. For example, BD and ROi/Mercy have established a process to add GTIN data and other key product data attributes into their IT systems before new BD products are purchased.



By using GTINs, trading partners can eliminate cross-reference tables for translating provider-assigned product numbers to a manufacturer’s catalogue number, thus reducing potential errors.



This means that BD and ROi/Mercy continue to achieve many of their targeted perfect-order benefits, including:

- 31.1 percent improvement in the ROi/Mercy ready-to-pay timing
- 75 percent improvement in the ROi/Mercy receive-to-match timing
- 30 percent reduction in days payable outstanding, improving cash flow
- 73 percent reduction in discrepancies on purchase orders, increasing accuracy and costs savings due to significantly fewer reworks
- Increased productivity, increasing the time people can work on other value-added activities
- Fewer number of calls to customer service, increasing satisfaction
- Improved inventory management with fewer stock outs, increasing product availability for improved patient care

The use of GTINs and GLNs in EDI transactions also leads to a range of benefits for both sides of the trading relationship.

- By using GTINs, trading partners can eliminate cross-reference tables for translating provider-assigned product numbers to a manufacturer's catalogue number, thus reducing potential errors.
- GTIN usage can also eliminate confusion when dealing with products containing multiple levels of packaging. Each unique GTIN is assigned to a unit of measure; so there is no need for the healthcare provider to supply a UOM in the EDI message, ensuring that the correct level of packaging is ordered, shipped and invoiced.
- By assigning GLNs, healthcare providers are not required to use the manufacturer-assigned, or distributor-assigned customer numbers for EDI, again eliminating the need to map tables and resulting potential errors.



Being more efficient and eliminating supply chain errors means healthcare providers can focus their resources on patient care instead of supply chain rework. Also, eliminating supply chain errors helps to ensure that the right products arrive at the right location when needed by the clinicians.

## Exploring clinical applications

Using GS1 standards in EDI transactions and business processes is really only the beginning. Today, Mercy uses GS1 standards, where applicable, to track products throughout its supply chain all the way down to the point of consumption in the clinical setting.

Awarded a grant by the U.S. Food and Drug Administration (FDA) in 2012, Mercy began by tracking and documenting the consumption of coronary stents in its cardiac catheterisation laboratories. To automate this capture and gain better visibility to product, Mercy implemented a scanning solution, first within its cardiac cath labs, to document the receipt, storage, consumption and reordering of stents—all using Unique Device Identification (UDI) enabled by GTINs.

These GTINs could be linked to attributes contained within the FDA's Global UDI Database (GUDID) as well as key clinical attributes in Mercy's Supplemental UDI Database. These GTINs have also been integrated in Mercy's ERP software, its inventory management system, and electronic health record system to uniquely identify stents as they are managed as inventory and used in patients.

Since this project, Mercy has been awarded another FDA grant to continue to expand this research with two other health systems.

"We continue to expand the tracking of UDI and GTINs beyond our cardiac catheter labs, which involves a relatively small number of products, to other procedural areas, such as the OR," explains Mentel. "By documenting consumption, we have access to accurate inventory and replenishment practices to ensure that needed products are always there. This information can also provide our clinicians with some very compelling data about these products, how they are used, and their effectiveness levels."

---

"The barcode scanning capability in our Cath Labs enabled us to capture coronary stent GTINs and associate them with the patients in which the devices were implanted. That was the key to bringing device and clinical data together so that we could track stent performance over time assessing both safety and effectiveness by key device attributes such as dimensions or impregnated drug. This is powerful information for physicians and patients and will have applicability to all implanted devices."

**Dr. Joseph Drozda**, Director of Outcomes Research, Mercy Health System

---

"Scanning and tracking of a GTIN throughout the supply chain and on to the point of consumption is key. The scanning of the GTIN allows us to manage and remove the risk of an expired product being used at the point of care. In addition, once GTINs are more extensively used in recalls, we will also be able to leverage this same scan to remove the risk of recalls being used on patients, accurately track the recalled product to the patients who received it and trace it back to the supplier who sourced it. GS1 standards also help us confirm the authentication of products received, verifying their chains of custody."

**Matt Mentel**, Executive Director, Integrated Performance Solutions, ROi/Mercy

---

“GS1 standards provide a common language for our EDI transactions, directly impacting data quality.”

**Matt Mentel**, Executive Director,  
Integrated Performance Solutions, ROi/Mercy

---

“By documenting consumption (with GS1 standards), we now have accurate inventory and replenishment practices to ensure that needed products are always there. This information can also provide our clinicians with some very compelling data about these products and their effectiveness levels.”

**Matt Mentel**, Executive Director,  
Integrated Performance Solutions, ROi/Mercy

---

“In the U.S. and many other countries, there’s a tremendous amount of discussion about migrating to GS1 standards. We’re sharing our work as much as possible to help move the industry forward. Our priority is not about gaining a competitive advantage—it’s about making our healthcare system work better for everyone.”

**Dennis Black**, Director, e-Business, Solutions Group, BD  
Integrated Performance Solutions, ROi/Mercy

## Looking to the future

ROi/Mercy continues to encourage its other suppliers to use GS1 standards and EDI communication for transactions. Simply put, storing GTINs in internal hospital systems creates a foundation for GTIN usage in scanning programs, electronic health records, comparative effectiveness research, recalls and other clinical applications.

BD is also urging its customers to use the GS1 data standards since they provide a common business language that can enable accurate business transactions and support many of the clinical initiatives that healthcare providers are implementing.

BD has a comprehensive EDI program in place and is looking to extend this further. Considering the EDI transactions exchanged with the largest healthcare provider systems in the U.S., over 96 percent of products purchased from BD are via EDI and error rates per order are very low, ranging between 0 to 3 percent of line items. BD’s goal is to have 100 percent of its products purchased via EDI with zero transactional errors in any given month—and many customers today are achieving this.

For hospitals, using GS1 standards is quickly becoming a fundamental element of their operations. “Using GS1 standards on all products is essential to the overall successful operations of hospitals, long term,” explains Mentel. “Going forward, we want to ensure the results and practices developed from our work with BD are extended to all Mercy suppliers and beyond to the entire industry.”

Black with BD agrees, “In the U.S. and many other countries, there’s a tremendous amount of discussion about migrating to GS1 standards. We’re sharing our work as much as possible to help move the industry forward. It’s about making our healthcare system work better for everyone.”



---

## About the Authors



### **Dennis Black**

*Director, e-Business, Solutions Group, BD*

*With more than 25 years of healthcare industry experience, Dennis has responsibilities on the BD Signature Solutions team that include, leading collaborative initiatives with healthcare providers, UDI implementation, achieving the "Perfect Order", and refining e-Business processes. Dennis is on the GS1 Healthcare Global Leadership Team, and the GS1 Healthcare U.S. Executive Leadership Team. He also participates in work groups within GS1, SMI, AdvaMed, MDSCC and other organizations that are focused on improving the healthcare supply chain. Dennis is currently involved in a number of pilot and implementation activities to enable BD and healthcare providers to achieve operational efficiencies using GS1 standards.*



### **Matthew Mentel, CMRP, M.H.A., M.B.A.**

*Executive Director, Integrated Performance Solutions, ROI/Mercy*

*As the Executive Director for Integrated Performance Solutions, Matt and his team are responsible for identifying, designing and implementing creative solutions as well as leveraging current technology to drive efficiency and expense reduction throughout Mercy. He oversees several key initiatives that seek to optimise the use of tools, technology, process improvement and metrics across the entire care continuum, driving more predictive and outcomes based decisions that help improve and enrich the Mercy experience for caregivers and patients. Matt has more than 24 years of experience in healthcare, including 15 years in supply chain and information technology. He has held various positions with Mercy— the sixth largest Catholic health care system in the United States. Matt's career includes service to a variety of other healthcare providers, including ROi (Resource Optimization & Innovation), SSM Healthcare System, BJC Healthcare and St. Louis University Hospital, as well as a healthcare consulting/accounting firm. Matt is a member of the Association for Healthcare Resource & Materials Management (AHRMM) and Healthcare Information and Management Systems Society (HIMSS). Matt received a bachelor's degree in Management Information Systems with a Certificate in Health Information Management, a Master of Health Administration, and a Master of Business Administration from St. Louis University.*

---

## About BD

*BD is a global medical technology company that is advancing the world of health by improving medical discovery, diagnostics and the delivery of care. BD leads in patient and health care worker safety and the technologies that enable medical research and clinical laboratories. The company provides innovative solutions that help advance cellular studies and genomics, enhance the diagnosis of infectious disease and cancer, improve medication management, promote infection prevention, equip surgical and interventional procedures, optimize respiratory care and support the management of diabetes. The company partners with organizations around the world to address some of the most challenging global health issues. BD has more than 45,000 associates across 50 countries who work in close collaboration with customers and partners to help enhance outcomes, lower health care delivery costs, increase efficiencies, improve health care safety and expand access to health.*

[www.bd.com](http://www.bd.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.*

[www.mercy.net](http://www.mercy.net)

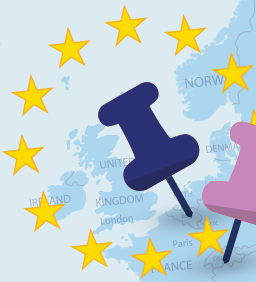
---

## 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 management, and distribution and transportation management.*

[www.roiscs.com](http://www.roiscs.com)







# Government initiatives



## Government initiatives

# Indian government implements track and trace system for pharmaceuticals

For continued confidence in exported pharmaceuticals from India, the government wanted a mechanism by which patients and regulators worldwide could verify their information. With this primary objective, the Indian government's National Informatics Centre (NIC) designed the Drug Authentication and Verification Application (DAVA) based on GS1 standards. GS1 standards make it possible to uniquely identify, capture and share important information on these pharmaceuticals with regulators and patients, thereby further strengthening India's reputation as a leading producer of quality and safe drugs.



*By Anil K. Sinha*

## Background

The Indian pharmaceutical industry is the third largest in the world in terms of volume, accounting for 10 percent of the world's production. India's total export of pharmaceuticals in 2015-2016 was about US \$18 billion. With exports to more than 200 countries, India is the world leader in the production of generic drugs and vaccines. Every third dose of vaccine administered anywhere in the world comes from an Indian manufacturing facility.

## The challenge of protecting image and safety

To maintain and grow its leadership position as the world's leading manufacturer of pharmaceuticals, the Indian government wanted to take proactive measures to ensure the safety and security of pharmaceuticals produced and exported from the country.

This strategy was adopted to protect India's brand image as a producer of safe and quality drugs amid growing concerns of regulators and patients worldwide regarding the general increase of counterfeit drugs. It was also a means to prevent counterfeits from ever entering the

supply chain and in the event that they did, then to quickly identify the counterfeit.

With these objectives the government wanted to:

- Build a mechanism by which it could have visibility on all drugs produced and exported from the country by the estimated 2,000 large, medium and small manufacturers.
- Provide regulators and patients across the world a means to verify the product details, including at which Indian manufacturing facility the pharmaceutical was produced.

Given the size of the Indian pharmaceutical industry, one of the biggest challenges for the government was to develop a solution that would provide real-time visibility to all manufactured and exported drugs in the country.

In order to provide such information to a global audience (regulators, importers and patients), an infrastructure, which was robust and easy to access by thousands of manufacturers including small and medium enterprises to facilitate information flow was needed.

The solution required accurate identification of all pharmaceuticals manufactured for exports and the capture of information related to its

production, batch number, and expiry date and more, which could then be authenticated globally.

### Traceability with GS1 standards

A traceability system based on GS1 standards proved an ideal solution for the Indian government. It not only gave the ability to accurately identify pharmaceuticals at various packaging levels, but it also provided the ability to collect and store product information that would help identify from which manufacturing unit it came.

An added advantage in using GS1 standards in the traceability solution was that it gave Indian manufacturers the ability to comply with regulatory requirements of different importing countries such as the U.S. Food and Drug Administration’s (FDA) unique device identification of medical devices (UDI) regulation, Drug Supply Chain Security Act (DSCSA) requirements and the European Union Falsified

Medicine Directive. Use of GS1 standards also increased the possibility of a manufacturer’s entry into these markets, if it didn’t previously do so.

The traceability system was named DAVA, which means “medicine” in the Indian language (and is also the abbreviation for Drug Authentication and Verification Application). This system has made it possible to gain real-time visibility to pharmaceuticals produced and exported from India.

DAVA relies on the use of Global Trade Item Numbers (GTINs) plus serial numbers by manufacturers to easily identify the various packaging hierarchy levels of pharmaceuticals such as primary, secondary and tertiary (when a trade item) levels.

While some information like the brand name is captured in the system, the information in the table below is captured through GS1-128 and GS1 DataMatrix barcodes.

### GS1 standards used by DAVA

Packaging Level	Barcode Symbology	Encoded Information
<b>Primary Level</b> Innermost level of packaging, which is in direct contact with the product (e.g., medicine strip, vial, single therapy kit)	GS1 DataMatrix	<ul style="list-style-type: none"> <li>• GTIN</li> <li>• Expiry date</li> <li>• Batch number</li> <li>• Unique serial number</li> </ul> <i>(Use of unique serial number at this packaging level is optional.)</i>
<b>Secondary Level</b> Packaging level containing primary level packages (e.g., mono-cartons)	GS1 DataMatrix or GS1-128	<ul style="list-style-type: none"> <li>• GTIN</li> <li>• Expiry date</li> <li>• Batch number</li> <li>• Unique serial number</li> </ul>
<b>Tertiary level</b> Outermost level of packaging containing secondary and other intermediate packages that may be used as either a trade item or a logistic unit meant for transport (e.g., cartons, pallets, shipments)	GS1-128	When a trade item: <ul style="list-style-type: none"> <li>• GTIN</li> <li>• Expiry date</li> <li>• Batch number</li> </ul> When a logistics unit: <ul style="list-style-type: none"> <li>• Serial Shipping Container Code (SSCC)</li> </ul>

Implementation is being rolled out in phases, starting with large and medium manufacturers and followed by small-scale manufacturers. Implementation of the barcode labelling and marking requirements for the secondary and tertiary-level packaging has been mandated, while barcoding at the primary level is optional.

Manufacturers maintain parent-child relationship information, (i.e., which product is in which secondary pack and in which tertiary pack)

so that at any point it’s possible to identify the secondary packs of a tertiary unit and the primary pack of a secondary unit. This information is essential to establish pedigree of the product in order to provide its authentication.

Manufacturers and exporters directly upload data to DAVA after production and before the consignment leaves their manufacturing facilities. The accuracy, completeness and timely upload of the data is their responsibility.

DAVA is also integrated with a mobile application, which empowers customs officials, regulators, importers and patients to authenticate product information of pharmaceuticals by simply scanning the barcode on any of its packaging levels. When a product's barcode is scanned, all the information associated with the product is retrieved from the DAVA system. This gives the user the opportunity to authenticate the product.

An added advantage in using GS1 standards in the traceability solution was that it gave Indian manufacturers the ability to comply with regulatory requirements of different importing countries such as the U.S. Food and Drug Administration's (FDA) unique device identification of medical devices (UDI) regulation, Drug Supply Chain Security Act (DSCSA) requirements and the European Union Falsified Medicine Directive. Use of GS1 standards also increased the possibility of a manufacturer's entry into these markets, if it didn't previously do so.

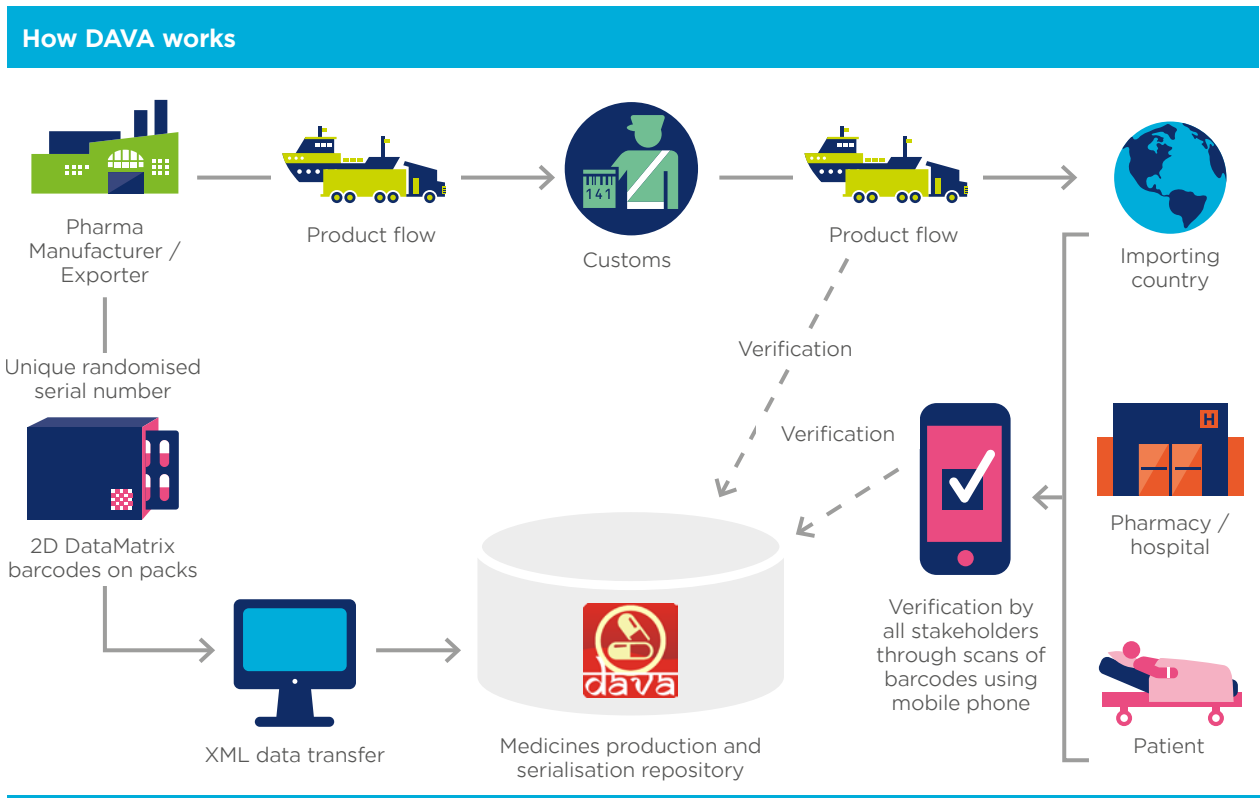
## Increasing efficiencies and guarding against counterfeits

The main goal of the Indian authorities was to provide real-time information online to authorities and patients of pharmaceuticals manufactured in India.

By implementing DAVA, India has achieved that and more. More than 2,000 pharmaceutical export manufacturers will be estimated to upload production level data for millions of drugs to DAVA over the next months.

Despite its recent rollout, the government and pharmaceutical industry are already seeing some benefits. Once fully implemented, DAVA enabled by GS1 standards is expected to deliver the following:

- Pharmaceutical consignments are expected to move through customs both in India and at the importing country much faster than it does today, because consignments can be quickly inspected by scanning barcodes and validating them against the data available in DAVA.



- Indian pharmaceutical manufacturers will be able to improve the accuracy of their dispatch processes and enable efficient and automated FIFO (first in, first out) management.
- Indian pharmaceutical manufacturers will have a competitive edge in international markets for being able to comply with various global and national regulations and buyers' requirements.
- Global confidence in India's brand image as a safe producer of pharmaceuticals will be protected.
- Indian regulators will be able to fight any false counterfeit allegations, if and when required.
- Consumers will be empowered to authenticate and be protected against health and safety risks associated with counterfeits.

The Asia-Pacific Council for Trade Facilitation and Electronic Business (AFACT), under the United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT), awarded the e-ASIA Award to DAVA, as the best trade facilitation system in the region.

## The way forward

With the success of this project, the government of India plans to expand this system to capture information on drugs that are manufactured for the domestic market as well. The domestic rollout may have added capabilities such as tracking the movement of pharmaceuticals from point-of-manufacture to point-of-sale by capturing all distribution points and stakeholders in the supply chain.

In addition to helping prevent counterfeits and giving patients the ability to authenticate drugs, the added capabilities will help government officials monitor the availability of stocks in an area or with a wholesaler or retailer at any given point in time. This information would be extremely valuable to mobilise drugs to a region during epidemics or disease breakouts.

Such a rollout will also make drug recalls easier and more efficient and improve overall patient safety by ensuring that only safe and genuine drugs make their way to patients.

---

### About the Author



**Anil K. Sinha** is the Deputy Director General of the National Informatics Centre and the Mission Leader for the eTRADE project for the Government of India. With over 30 years of experience in Information Technology and E-Governance, Mr. Sinha has been

instrumental in the introduction of ePayments for government businesses. He has also played a key role in the implementation of several key projects such as eDelivery of Services, which includes the automation of licensing processes, integration of digital signatures, implementation of Electronic Bank Realisation Certificates (eBRC), and DAVA among others. As the head for the IT division of various departments under the Ministry of Commerce, Mr. Sinha has been responsible for policy changes as well.

---

### About DAVA and the National Informatics Centre

The National Informatics Centre (NIC) is responsible for the design, development and implementation of the Drug Authentication and Verification Application (DAVA) system on behalf of the Director General of Foreign Trade (DGFT). Based on GS1 standards, DAVA enables manufacturers to share important information on these pharmaceuticals with regulators and patients, thereby further strengthening India's reputation as a leading producer of quality and safe drugs. NIC is the premier science and technology organisation of India's Union Government in informatics services and information-and-communication-technology (ICT) applications. NIC is a part of the Indian Ministry of Communications and Information Technology's Department of Electronics & Information Technology and has played a pivotal role in steering e-governance applications in governmental departments at national, state and district levels, enabling the improvement in, and a wider transparency of, government services.

Other project stakeholders include the Ministry of Commerce and Industry, Ministry of Health & Family Welfare, Directorate General of Foreign Trade (DGFT), Pharmaceutical Export Council of India (Pharmexcil) and GS1 India.

[www.nic.in](http://www.nic.in)



Government initiatives

# The Value of Trusted Product Data

## Vital asset for health

At the epicentre of today’s changing healthcare sector, hospitals are pushing forward to provide quality patient care while faced with a number of challenges such as more regulations, new patient demands and rising costs.

In response, hospitals worldwide are stepping up to harness GS1 standards and technologies to streamline inefficient processes and improve patient safety. They are especially focused on gaining access to trusted product data—recognising it as a vital asset for the health of their processes and patients.

To better understand the impact of trusted product data, GS1 talked with healthcare providers and government agencies from different parts of the world. This paper summarises perspectives about their journeys to transform their hospital or even an entire country’s healthcare system for greater efficiencies, lower costs and improved patient outcomes.

## Patient care and costs

Leading the need for change in hospitals are two major forces: patients and costs.

Patients are becoming more and more engaged and knowledgeable when it comes to managing their health. They have access to a wealth of online information about every aspect of their lives and expect the same from healthcare providers—helping them to make informed decisions.

“To grow or even maintain a patient base, hospitals must offer excellent services—consistently,” says Sandi Michel, Director of Supply Chain Systems and Quality, Franciscan Missionaries of Our Lady Health System (FMOLHS) in the U.S. “A critical factor for a hospital’s growth is having the right product at the right time, in the right place for physicians to provide these services—something that is only possible with quality product data.”

Andrew Potter, Group Inventory Manager for Ramsay Health Care (Ramsay) echoes the need for products that are always available. Mr. Potter and his peers support the hospital group’s supply chain with more than 200 hospitals and day surgery facilities across Australia, France, Indonesia, Malaysia and the UK. “Data is the lifeblood of our business. Leveraging product data for a highly efficient supply chain helps us ensure that every patient has a seamless care experience with a positive outcome.”



“Data is the lifeblood of our business.

Leveraging product data for a highly efficient supply chain helps us ensure that every patient has a seamless care experience with a positive outcome.”



**Andrew Potter**, Group Inventory Manager, Ramsay Health Care, Australia



“For safe and efficient procedures, the right

people—patients and healthcare providers—the right appliances, and the right medical supplies have to come together at the right time and place. The same is true for information about all these components.”



**Dr. Hajo Reissmann**, Head of Medical Supply Controlling, UMCSH, Germany



## Safer and better treatments

Patient safety is also spurring hospitals to demand more complete and accurate data from suppliers. Regulations such as the Unique Device Identification (UDI) system established by the United States Food and Drug Administration (FDA), the U.S. FDA Drug Supply Chain Security Act (DSCSA), and the European Union Falsified Medicines Directive are calling for a harmonised, global system for uniquely identifying products—medical devices and pharmaceuticals—as they travel from manufacturers to hospitals and ultimately, to patients. By accessing this global system of trusted product data, hospitals can facilitate more efficient recalls and verify the legitimacy of drugs for safeguarding patients.

Dr. Hajo Reissmann, Head of Medical Supply Controlling, University Medical Centre Schleswig-Holstein (UMCSH), discusses the need for standardised product data attributes—such as descriptions, sterilisation requirements and strength—to enable more effective clinical treatments. “When medical devices and pharmaceuticals are clearly and uniquely identified, physicians can more easily analyse and compare results from the products used. With globally defined product data, physicians across borders can collaborate to make adjustments for more positive outcomes.”

Dr. Reissmann stresses the value of enhanced master data for clinical processes: “For safe and efficient procedures, the right people—patients and healthcare providers—the right appliances, and the right medical supplies have to come together at the right time and place. The same is true for information about all these components. This is obvious with respect to the patient: Pre-existing diseases, allergies and other conditions must be brought to the attention of providers. However, the same is true for the properties of the medical devices. A second challenge besides acquiring or generating that information is its propagation within the hospital’s IT landscape in order to have it readily available at the various points of care.”

## Costs in the supply chain

Perhaps the most pressing need for trusted product data resides in the hospital’s supply chain to control costs.

In Australia, the National E-Health Transition Authority (NEHTA) is supporting the country’s healthcare providers and suppliers as they move from manual to automated “eHealth” processes, including significant supply chain reform.

Paul Broadbridge heads NEHTA’s supply chain initiatives that includes giving hospitals access

to standardised product data residing in the GS1 Global Data Synchronisation Network™ (GDSN®), called the National Product Catalogue (NPC) in Australia, and an eProcurement solution designed to streamline purchasing based on GS1 standards.

“We’re focused on bringing together disparate sources of product data to reduce inefficiencies that add costs to our national healthcare supply chain,” explains Mr. Broadbridge. “With eHealth, it’s about combining the best product information with the best patient information, and then putting this information in the hands of hospitals to deliver the best care.”

Herman de Smit, Logistic Consultant at several hospitals in the Netherlands, summarises the value of product data for health system processes: “Validated product data is crucial to optimally streamline logistic, administrative and care processes. It can be used in financial processes to determine the value of inventory, reduce waste and help calculate the cost of treatments. Trusted data enables traceability of care products for patient safety, and ultimately needs to make employees’ work easier each day.”

More than five years ago, the Geisinger Health System (Geisinger) in the U.S. recognised the need to drive positive change across the healthcare supply chain when it teamed with four other healthcare systems—Intermountain Healthcare, Kaiser Permanente, Mayo Clinic and Mercy—to create the Healthcare Transformation Group.

“We came together to collectively voice the need for the accelerated transformation of healthcare processes using GS1 standards,” says Kevin Capatch, Geisinger’s Director of Supply Chain Technology & Process Engineering. “The area where standards, especially the GS1 GDSN, can have significant impact today is in the hospital’s procurement process.”

## Seamless order to cash

Mr. Potter with Ramsay agrees that supply chain improvements can add up to significant savings. He is automating Ramsay’s entire order-to-cash process, using GS1 EDI standards and product data shared via the NPC. “To control escalating costs, we’re optimising our supply chain with data standards for purchase orders, purchase order responses and invoices.”

According to John Mazzoli, Data Governance Manager with CHRISTUS Health (CHRISTUS), his organisation’s purchasing department once wasted hours on correcting order errors and



“Trusted data enables traceability of care products for patient safety, and ultimately needs to make employees’ work easier each day.”

## Dstiny

ORGANISATIEVERBETERING

Herman de Smit, Logistic Consultant, Multiple Hospitals, Netherlands



“It’s a seamless order-to-cash process that can only be

achieved with accurate product data provided by the GDSN.”



John Mazzoli, Data Governance Manager, CHRISTUS Health, U.S.



“In just one pilot, we were able to save \$52,000 a year

by not having staff review every single order.”



Sandi Michel, Director of Supply Chain Systems and Quality, FMOLHS, U.S.

locating products that were shipped to wrong locations. Now, this major health system is in the final stages of constructing a master data management system and fully automating its order-to-cash process. Like Ramsay, CHRISTUS intends to reduce human intervention—along with the associated errors and costs—from the process.

One of CHRISTUS' first steps was to assign GS1 Global Location Numbers (GLNs) for 44 of its more than 235 hospitals and other care facilities located throughout Texas, Louisiana and New Mexico in the U.S. as well as in Chile and Mexico.

Working with its group purchasing organisation, MedAssets, CHRISTUS plans to leverage product data from the GDSN to automatically feed and update its master data management system. As products are used in CHRISTUS hospitals and clinics, the unique product identifiers or GS1 Global Trade Item Numbers (GTINs) embedded in barcodes, will be scanned. When the number of scans or uses hits a product's reorder level, a purchase order (PO) will be automatically generated containing the needed products with pricing, identified by GTINs.

"The PO will automatically flow to the supplier who will fill the order and ship it to the right location by referencing the care facility's GLN on the PO," explains Mr. Mazzoli. "When the shipment arrives and is verified, an electronic invoice will be sent to our accounts payable department, and the funds will be electronically transferred to the supplier. It's a seamless order-to-cash process that can only be achieved with accurate product data provided by the GDSN."



"It's important that hospitals communicate the shared

benefits of using accurate product data to their suppliers."

nehta

Paul Broadbridge, Manager eHealth Value Chain, NEHTA, Australia

## GDSN and the GUDID

In September 2013, the U.S. FDA released its UDI regulation to establish a common, worldwide system for uniquely identifying all medical devices entering the U.S. market. As a result, many manufacturers have applied unique product identifiers to all of their medical devices and are maintaining their UDI data in the FDA's Global Unique Device Identification Database (GUDID) based on FDA deadlines.

While they may choose from multiple options, many manufacturers have made the strategic decision to use the GDSN and their GS1-certified data pools to feed UDI data into the GUDID—to meet immediate FDA compliance needs as well as future customer and regulatory requirements in other parts of the world.

Even though the GUDID contains FDA-required medical device data, it alone does not provide all the product data needed by hospitals to meet eProcurement and other process transformation goals. For example, the GUDID does not include pharmaceutical and consumable product data as well as some types of device data like weight, dimension, packaging information, handling, storage, waste and recycling.

"The GDSN has a broader range of product information than the GUDID," advises Ms. Michel with FMOLHS. "And with the FDA's DSCSA, we are required to capture all that information, store it and report on it for six years."

The GDSN provides a mechanism for suppliers to provide data in a trusted and secure way for any product a hospital consumes. Essentially, one connection can provide data for all products for any hospital anywhere in the world.

For more information on GDSN in healthcare, visit [www.gs1.org/healthcare](http://www.gs1.org/healthcare).



## Saving time and space

FMOLHS is also working to fully automate its order-to-cash process. After conducting several pilots with suppliers, Ms. Michel reports the new process has removed multiple steps of manual intervention and has eliminated errors. “By using GTINs for accurate product data, it’s taken a lot of labour and time out of the process. In just one pilot, we were able to save \$52,000 a year by not having staff review every single order.”

As its next step, FMOLHS is now implementing the GDSN to further streamline the process. Working with its chosen GS1-certified data pool, FMOLHS is reaching out to manufacturers to bring them on board. “With the GDSN, we’ll be able to maintain the accuracy of our product data,” says Ms. Michel. “And with up-to-date product data, we expect to further standardise the products we buy and use for even more cost savings.”

Ms. Michel also notes that the use of accurate product data—weight, dimensions and packaging—will help the FMOLHS warehouse management system run more efficiently and save valuable space in its new Central Distribution Centre.

The Office of Data Standards and Interoperability led by Ms. Michel, is in the process of assigning GLNs down to PAR locations to enhance product tracking across the health system, expedite product delivery and allow automation to drive efficiencies. Using GLNs will allow FMOLHS to reduce the time it takes to locate products anywhere within its health system to better execute recalls, advance inventory management and accelerate asset tracking.

## Collaborating for trusted data

Additional efforts to automate the order-to-cash process are taking place throughout entire healthcare systems in Australia and the UK.

For many healthcare systems, the global nature of the GDSN is a major benefit since many purchases of healthcare products are off shore and from global healthcare manufacturers. “Using the GDSN is not only a benefit for healthcare providers, but also for suppliers as global businesses,” explains Mr. Broadbridge with NEHTA. “By publishing their product catalogues only once in the GDSN, suppliers can save significant time and improve accuracy when compared to providing their product data in multiple formats for multiple providers.”

Mr. Broadbridge continues that collaborating with suppliers should be part of any hospital’s successful implementation of the automated procurement process. “It’s important that hospitals communicate the shared benefits of using accurate product data to their suppliers. Electronic POs can flow directly into suppliers’ systems; so they don’t need a team of people reading orders. And a supplier’s cash flow improves when accurate invoices are electronically delivered and paid faster.”

To support Australia’s hospitals, NEHTA has undertaken a comprehensive education campaign for suppliers. An increasing number of Australian hospitals have mandated or provided



“The adoption of GS1 standards and the

development of a shared product catalogue enables end-to-end traceability and full automation for healthcare supply chains.”

OSPIDÉAL NAOMH SÉAMAS  
ST. JAMES’S HOSPITAL



**Vincent Callan**, Director of  
Facilities Management, St.  
James’s Hospital, Ireland

preferential weightings to the use of the NPC in their supplier contracts. According to Mr. Potter, many of Ramsay’s suppliers have posted their entire product catalogues in the NPC, with Ramsay also now requiring NPC data as part of its processes. As of January 2016, more than 370,000 products now reside in the NPC.

St. James’s Hospital in Ireland also recognises the value of working closely with suppliers. The hospital is fully automating its order-to-cash process with the goal to include all suppliers over the next couple of years, prioritising high-value, critical product categories.

Initially partnering with Cruinn Diagnostics, Fannin/DCC Vital and Johnson & Johnson, the hospital started the eProcurement project by linking its existing codes to GTINs. The suppliers’ data was mapped to an agreed upon dataset, which was then uploaded to the NPC for review and import by St. James’s. The hospital is also using the accurate product data to electronically exchange procurement messages based on EDI for even more benefits. The next step for the hospital is to use the product data to capture information at the point of care.

“The adoption of GS1 standards and the development of a shared product catalogue enables end-to-end traceability and full automation for healthcare supply chains,” explains Vincent Callan, Director of Facilities Management. “It provides the means to converge clinical and business systems, which supports the ‘money follows the patient’ model.”

## Proving the benefits

In the UK, Steve Graham, eProcurement Lead, and his team from the Department of Health are making progress to automate healthcare processes across the country’s system of National Health Service (NHS) trusts or healthcare providers with the objective of saving more than €462 million (£350 million) and releasing a significant amount of clinical time back to patient care.

A primary use case for their five-year project is the order-to-cash process where suppliers are being asked to select their respective GS1-certified data pool for publishing their entire product catalogue in the GDSN. Since every hospital has its own system and preferences, it will be able to select only the products in which it is interested to “bring into” its own system’s catalogue.

“Data pools and the GDSN give us a very clear and straightforward way for getting masses of accurate and up-to-date product (and price) data from suppliers to any one of our NHS hospitals,” says Mr. Graham.

The team is working directly with six trusts as demonstrator sites to implement the electronic order-to-cash process along with two other processes enabled by GS1 standards—product recall and inventory management.

“With these six hospitals and their suppliers, we intend to measure the actual, tangible results,” explains Mr. Graham. “Even though we’re focused on this small number of trusts and suppliers, we’re keeping the whole system moving forward. As we prove in the results with the few, we will communicate the benefits to all throughout this five-year journey.”



“Data is not ‘trusted’ until you start transacting with it. With the GDSN, the good news is that, as issues are resolved between supplier and provider, this accurate data is pushed out to every provider. And as data is traded, it gets stronger and stronger with every transaction.”

# Geisinger

**Kevin Capatch**, Director of Supply Chain Technology & Process Engineering, Geisinger Health System, U.S.



“We can learn from the retail experience where it took

the sector several years to get GS1 standards embedded into their businesses. And it won’t be any different for us in healthcare.”



Department of Health

**Steve Graham**, eProcurement Lead, Department of Health, UK

## Lessons along the way

- **Data is a powerful asset**—the foundational language—for your business. If you maintain data on an ongoing basis, it will serve you well—today and in the future.
- **Product data is as important as the product itself.** And the quality of the product data is a direct reflection of the quality of the product and its manufacturer.
- **Automate the order-to-cash process.** Start here for significant impact and plan to expand to other processes such as product recall, inventory management and asset tracking.
- **Collaborate with suppliers for mutual benefits.** Sharing trusted data comes with shared responsibilities and shared benefits. With this understanding, the journey will be easier.
- **Create a project plan with attention to details.** Break it up into manageable pieces and use a cross-functional governance body for greater visibility. It's not simply an IT project. Get clinical nursing directors and surgeons to provide their direction and influence.
- **Communicate frequently**—with internal stakeholders, executives and suppliers—about the value of using accurate and complete product data. Share improvements and progress at each milestone and celebrate success.
- **Benefits are real.** Savings can be achieved: time, costs and productivity. Conduct pilots with trusted suppliers to prove in the results.
- **Take a long-term approach with a sense of urgency.** Start now yet realise it will take a concerted effort over several years. Determination and patience will pay off. Remember that you are changing systems and how people work.

As Mr. Graham with UK's Department of Health puts it: "We can learn from the retail experience where it took the sector several years to get GS1 standards embedded into their businesses. And it won't be any different for us in healthcare."

### What does it take for product data to be "trusted"?

It all starts when suppliers collect, cleanse and manage their product data before publishing in the GDSN.

Mr. Capatch from Geisinger points to the importance of suppliers implementing processes that ensure the quality of their data. "Many of our manufacturers have devised internal strategies so that product data is accurate and complete, which gives me confidence. It's also important to note that significant efforts have been made by manufacturers to provide exact and trusted data to the FDA."

Mr. Potter with Ramsay advises that he looks to the GDSN's rigorous process checks for trusted data assurance and synchronises Ramsay's master database with any new supplier's published product data for alignment.

Yet, while suppliers may provide and validate their data, hospitals must also trust and use it to deliver value for all. "This is where collaboration is needed between suppliers and hospitals," explains Mr. Broadbridge with NEHTA. "Suppliers must understand the nature of product data for hospitals—whether for clinical, pharmaceutical or supply chain use—in order to provide the appropriate data with the appropriate validations. The importance of trusted data needs to be understood by all trading partners in the healthcare community. With this commitment, we can truly reduce costs and risks."

Cautiously optimistic, Mr. Capatch considers the supplier-provider relationship key. "Data is not 'trusted' until you start transacting with it. With the GDSN, the good news is that, as issues are resolved between supplier and provider, this accurate data is pushed out to every provider. And as data is traded, it gets stronger and stronger with every transaction."









### **About GS1 Healthcare**

GS1 Healthcare is a global, voluntary user community bringing together all healthcare supply chain stakeholders, including manufacturers, distributors, healthcare providers, solution providers, regulatory bodies and industry associations. The mission of GS1 Healthcare is to lead the Healthcare sector to the successful development and implementation of global standards by bringing together experts in Healthcare to enhance patient safety and supply chain efficiencies. GS1 Healthcare members include over 70 leading Healthcare organisations worldwide.

For more information about GS1 Healthcare, please visit [www.gs1.org/healthcare](http://www.gs1.org/healthcare)

### **GS1 AISBL**

Blue Tower, Avenue Louise 326, bte 10  
BE 1050 Brussels, Belgium

**T** +32 2 788 78 00

**E** [contactus@gs1.org](mailto:contactus@gs1.org)

**[www.gs1.org](http://www.gs1.org)**

