The Global Language of Business

Healthcare GLN Implementation Guideline

provides implementation guidance for those considering the use of the GS1 Global Location Number (GLN) in healthcare

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2.0	Sep 2018	Pete Alvarez	WR18-153 completely rewritten to reflect current implementation reality and guidance needed. It also contains guidance for uses in hospital environments.

Disclaimer

Accordingly, GS1 recommends that any organisation developing an implementation designed to be in conformance with this Specification should determine whether there are any patents that may encompass a specific implementation that the organisation is developing in compliance with the Specification and whether a licence under a patent or other intellectual property right is needed. Such a determination of a need for licencing should be made in view of the details of the specific system designed by the organisation in consultation with their own patent counsel.

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Table of Contents

1 Introduction

This document provides implementation guidance for those considering the use of the GS1 Global Location Number (GLN) in healthcare. The content and document have been revised since its initial development to reflect the status of the use of GS1 standards across the entire healthcare value chain including hospital settings, supply chains and regulatory environments.

This document also includes several implementation examples in order to illustrate how GLNs are used in various applications.

For additional information regarding the GLN standard refer to the _GS1 General Specifications_ and for assignment refer to the _GS1 GLN Allocation Rules_.

For local support and training please contact your local _GS1 Member Organisation_ (MO).

1.1 Who should use this document?

This document is intended for organisations and their personnel who are responsible for assigning and implementing GLNs to support internal and external operations.

For example:

- Healthcare providers, clinics, pharmacies, manufacturers, distributors, Group Purchasing Organisations (GPOs), Ministries/Departments of Health and regulatory bodies.

- National healthcare regulatory and standards bodies who govern healthcare supply chain and patient safety.

- Supply Chain managers, Information Technology (IT) Solution Providers in the areas of supply chain systems, finance and eProcurement systems, systems integration, ecommerce and clinical systems.

2 What is a Global Location Number?

The Global Location Number (GLN) improves the efficiency of communication among organisations. GLNs are key to retrieving information from databases.

The GLN enables the unique and unambiguous identification of any type of location used in business processes. Identification in this manner is a prerequisite for efficient communication between trading partners. A GLN acts as a database key which references location specific information that is repeatedly applied. Its function is to reduce input errors and increase efficiency.

GLNs provides a unique and unambiguous identification of the following:

1. **Legal Entities** – Any business, government body, department, charity, individual or institution that has standing in the eyes of the law and has the capacity to enter into agreements or contracts.

2. **Functions** – An organisational subdivision or department based on the specific tasks being performed, as defined by the organisation. Legal entities and functions can engage as parties in business processes. The use of Global Location Numbers (GLNs) in these areas is driven by the exact role of each party within a given business process.

3. **Physical Locations** - A site (an area, a structure or group of structures) or an area within the site where something was, is, or will be located. The identification of physical locations is an essential element for supply chain visibility. A GLN assigned to a physical location always has a permanent and identifiable geographical address regardless of any business process roles conducted at the site.

4. **Digital Locations** - A digital location represents an electronic (non-physical) address that is used for communication between computer systems. Just as the exchange of physical goods is a transaction between companies, the exchange of data is a transaction between systems, for example the delivery of an invoice by EDI or email to an accounting system.

Each company or organisation who is a member of a GS1 Member Organisation may use GLNs to identify locations under the terms of its membership. Contact details for all GS1 Member Organisations are available on the _GS1 website_.

Note: The GLN is fully compatible with ISO/IEC 6523 Information technology -- Structure for the identification of organizations and organization parts (Part 1 & 2). The international code designator (ICD) for the GLN is '0088'.

In business operations, location numbers must be associated with business attributes. The attributes of the location should be established as part of master data management using the GLN as the key to the information.

For smaller organisations, it may be sufficient to assign a single GLN at the highest level to cover all purposes. The degree of GLN assignment depends on the individual business needs and that of their business relationships. The GLN may be used as a replacement for a custom account number or similar identifier such as supplier number, vendor number, trading partner number, etc. However, this will require collaboration and communication among trading partner well in advance of the transition from an existing custom account number to the GLN.

Larger, more complex organisations may have more than one GLN to represent different discrete entities, locations or functions, for example:

■ A hospital may have a separate GLN for its billing department.

■ A hospital may have different GLNs for pharmacy, operating theatre and receiving departments.

■ A medical device supplier may have different GLNs for its UK, German and French subsidiaries.

Locations, functions and legal entities often have implied hierarchical structures. For example, a room, within a department, within a building within a hospital. Where hierarchies are needed, they should be built into a database that manages the GLN key rather than within the key itself. In cases such as these, it is best to not introduce an intelligence in the number structure of the GLN to replicate a hierarchy. This adds limitations making GLNs difficult to maintain, reduces the flexibility of changing organisations and makes IT systems more expensive to maintain. Please contact your local GS1 Member Organisation for additional information.

Below are examples of how Global Location Numbers can be used:

■ To identify an organisation as a corporate entity.

■ To identify physical locations such as a hospital, a storeroom, or a cart within an operating theatre.

- To identify a company's legal and functional entities engaging as parties in a particular business transaction, for example as buyer, seller, or carrier.

- In either a barcode or EPC/RFID tag to automatically identify locations such as storage places in a warehouse, the destination of a pallet, or the origin of a product.

- In electronic messages and registries to inform trading partners about companies and their corresponding GLNs and associated GLN information (e.g., Ship To/Bill to, Ship From/Remit to).

- In the Global Data Synchronisation Network (GDSN) to identify the organisations, data sources and data recipients.

- To provide more precise recording and sharing of supply chain events by adding the extension component to a GLN. For example, an extension component may identify sub-locations such as storage bins, dock doors, scan and read points.

- By organisations in the public sector. Various applications exist where governments use GLNs, either to identify their own agencies or to identify companies using central government databases.

In some countries, GS1 Member Organisations manage national GLN databases known as GLN registries. These registries provide a common list of GLNs registered within that country. The company issuing these GLNs is responsible for keeping business partners informed of all GLNs related to the trading relationship. For information on mergers and acquisitions refer to section 7 of this document and section 1.6 of the *GS1 General Specifications*.

3 Why are GLNs used?

The GLN not only identifies a specific party or location, but also provides the link to the information pertaining to it (i.e., a database holding GLN master data such as company name, and billing address). This is a key advantage of using a shared, globally unique identifier because all information can be held and maintained centrally in a database reducing the effort required to maintain and communicate information between multiple parties on a national or global basis.

This enables supply chain partners to simply reference a GLN in supply chain communications, as opposed to manually entering all of the necessary party/location information. Using a GLN to reference party/location information promotes efficiency, precision and accuracy in communicating and sharing location information.

3.1 GLNs in eCommerce transactions

GLNs are used in many types of electronic commerce transactions and are most commonly used in conjunction with Global Trade Item Numbers (GTIN) and Serial Shipping Container Codes (SSCC) for purchasing, shipping and invoicing transactions. They provide the globally unique identification needed to securely exchange business information on the Internet as well as unambiguously identifying all legal entities, physical/operational locations described in business documents.

GLNs ensure lean and efficient communication and processing since names, addresses and other information about particular locations do not need to be communicated with every transaction. The necessary information is communicated only once, stored in the relevant system (e.g., Enterprise Resource Planning system) and subsequently retrieved by referring to a globally unique GLN.

GLNs can identify suppliers, purchasers, ship to and bill to locations. GLNs are increasingly important in healthcare transactions to ensure correct pricing is applied to specific customers and that ordering and delivery processes can become increasingly efficient, requiring minimal intervention from clinical staff.

GLNs play a key role in computer-to-computer communications to support transactions, traceability and business processes. People will continue to use short form textual codes and descriptions to identify locations in their day to day communications. These codes and descriptions should be recorded as attributes of the relevant GLN.

3.2 GLNs in Data Synchronisation

When suppliers and their trading partners (i.e. distributors/wholesalers, hospitals) exchange item and/or price information about the products they trade, this process is called data synchronisation. The information exchanged for data synchronisation is non-transactional and includes the unique product identifier (GTIN) as the record key and additional information such as product descriptions, regulatory information, sizes and weights. This will ensure both sides of the trading relationships are operating with the same set of information. GS1 provides a standard for data synchronisation via its _Global Data Synchronisation Network (GDSN)_. The GDSN relies on the use of GLNs for unique identification of:

- Certified Data Pools

- Data source (provider of data to the GDSN)

- Data recipient (receiver of the data from the GDSN)

- The recipient of the price associated with an item (customer specific)

The use of GLNs in GDSN helps ensure that the right information gets to the right organisation at the right time.

3.3 GLNs in product traceability and recall

It is increasingly important for companies in all sectors to be able to trace their products through the supply chain. This is particularly important in the pharmaceutical and medical devices sectors where product quality and contamination issues may have major implications for patient safety. Companies already have legal and regulatory obligations to trace and be able to recall their products if issues are identified. However, this is often difficult due to the complexity of the supply chain and the range of systems and processes in use.

The GS1 Traceability in Healthcare standard is available for adoption by regulatory authorities worldwide to provide a single global interoperable mechanism for traceability and recall. GLNs, in conjunction with GTINs and serialised product identifiers, are required to enable products to be traced across the supply chain, with each transfer of control or transfer of ownership identified by the GLN of the receiving party.

Manufacturers are also interested in using GLNs to identify each party handling their products in order to ensure the integrity of the product and to combat counterfeiting.

Finally, healthcare providers can be required to use GLNs in conjunction with GTIN and Global Service Relation Number (GSRN) identifiers to ensure that products, equipment, staff and patients can be traced within a healthcare facility.

More information on the GS1 Traceability in Healthcare standard can be found at _https://www.gs1.org/traceability-healthcare_.

3.4 GLNs and physical location marking

Global Location Numbers can be encoded in GS1 data carriers, for example a barcode or RFID tag. This enables marking of the various locations throughout facilities with GLNs for accurate identification (e.g., a warehouse; a production line, a refrigerator, a doctor's room, an operating theatre; etc.). Marking locations within a facility with GLNs enhances your internal business and clinical processes by providing reliable and accurate location identification. Moreover, entering a GLN into an IT system automatically using data carriers (as opposed to typing it in) enables users to record a GLN with as minimal manual intervention as possible, increasing both speed and accuracy.

When physically encoding a GLN in a barcode symbol, GS1 Application Identifiers (AI) are used to indicate how the GLN is to be applied. For example, if a GLN is barcoded on a logistics label applied to a shipping unit, the organisation scanning the barcode needs to understand if the GLN is allocated to a ship to location or a ship from location. GS1 Application Identifiers provide this clarity.

Refer to section _6.2_ for examples of physical location marking in hospitals settings.

3.5 The GLN Service

In response to local users from many industries, some GS1 Member Organisations have created, or are in the process of establishing, local registries to store GLN information. The local GLN registries serve many industries such as Farming, Fast Moving Consumer Goods (i.e., retail), Government, Healthcare, Horticulture, Produce and Transport & Logistics to name a few.

In order to facilitate search for GLN information across local registries, the GLN Service was developed, and has been in production for a few years. Refer to the _GLN Service webpage_ for more information. To determine if there is a local GLN registry or if the local registry is connected to the GLN Service contact your local _GS1 Member Organisation_.

4 How are GLNs allocated?

In general, each organisation is responsible for assigning GLNs to their physical or digital locations, legal entities, or functions for which that organisation has responsibility (a process known as allocation).

There are different rules and best practices for GLN allocation depending on what the GLN is identifying, for example a physical location a legal entity, a digital location or a function (refer to section _2_ for more information). In practice, a single GLN may identify a combination, for example both a physical location and a function. In such cases, multiple rules and best practices may apply. Caution should be used in assigning multiple usage types to a GLN and consider the potential impact should one of those usage type changes. Refer to the _GLN Allocation Rules_ for information on GLN assignment.

4.1 GS1 Application Identifiers for GLNs

GS1 Application Identifiers (AIs) are numeric prefixes used in barcodes to define the meaning and format of encoded data elements. For example, the package shown below contains four GS1 Application Identifiers. The numbers shown in parenthesis are the GS1 Application Identifiers.
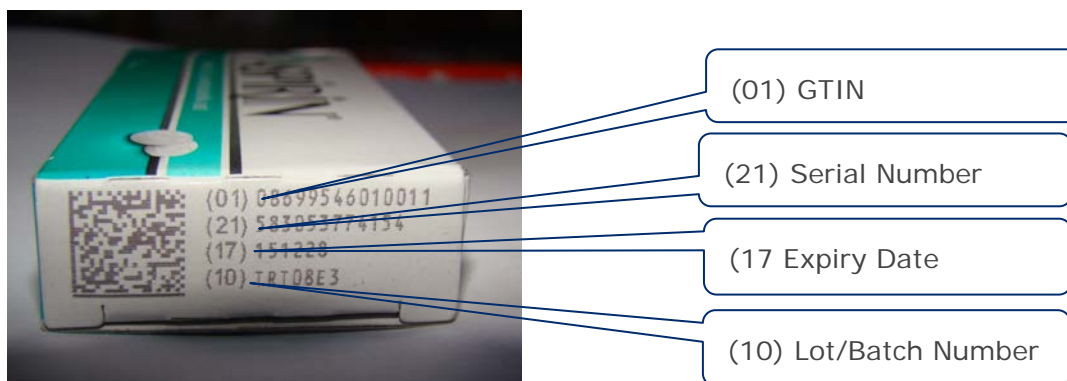
The GS1 system contains standards for a range of GS1 Application Identifiers that function as triggers when information is encoded in GS1 barcodes. These GS1 Application Identifiers tell the software application how to handle that information. For example, in which database field to store the information. Below are five GS1 Application Identifiers relevant to GLNs.

- AI (410): Ship to-Deliver to GLN
  - This is the address of the location where goods are to be delivered.
- AI (411): Bill to – Invoice to GLN
  - This is the addressee of an invoice or bill.
- AI (412): Purchased from GLN
  - This is the location of the company from which a product or service was purchased.

- AI (413): Ship for, Deliver for, Forward to GLN

  □ This is used by a consignee to determine the internal or subsequent destination of a physical unit.

- AI (414): GLN of a physical location

  □ This is the location of a physical location such as a door, room or control point.

> ✅ **Note**: For additional information on these and other Application Identifiers used with GLNs refer to _GS1 General Specifications_ sections 3.7.5 to 3.7.13

4.2 GLN extension component

The number of GLNs that an organisation can create is limited by the length of its GS1 Company Prefix (GCP), for example an 8 digit GCP can create 10,000 GLNs. This can be an issue when very large numbers of GLNs are required. For example, every shelf in a large medical records location, where this level of detail is only relevant to internal systems. In this case the GS1 Application Identifier (254) GLN extension component:, may be used to identify internal physical locations, such as storage bins, shelves or cupboards. Although optional, when used, GS1 AI (254) may only be used in conjunction with GS1 AI (414), Identification of a Physical Location. For more information on GS1 AI (254) refer to the _GS1 General Specifications_.

The GLN extension component: will not be communicated with trading partners except by mutual agreement and has been developed in expectation that it will become an important business requirement when used with RFID tags and EPC. Locations that currently have a GLN may also use an optional GLN extension component to distinguish unique sub locations (e.g., bed bays, storage slots, door locations, bin storage, shelves, peg holes, rack, cabinet, computer/communication bays, etc.). However, a company may choose to assign a unique GLN without an Extension component to identify these locations.

5 GLNs in manufacturing and distribution

Manufacturers and distributors depend on GLNs to identify specific legal entities, physical and functional locations in manufacturing and supply chain processes including EDI purchase-to-pay transactions. Additionally, GLNs are used by manufacturers and distributors in support of regulation and traceability applications.

For general information and guidance regarding the use of GLNs in manufacturing and distribution applications refer to the GS1 website - _https://www.gs1.org/id-keys/gln_

6 GLNs in hospitals

6.1 GLNs in supply chain operations

The healthcare supply chain can be highly complex, particularly with products being able to follow multiple routes between the manufacturer and a hospital. Products can be delivered direct to an operating theatre by a supplier or go via a combination of importer, third party logistics provider or distributor. Other healthcare products may have to be delivered to a central warehouse and then to the pharmacy department identified by a GLN while computer and medical equipment may have to be configured or tested by the IT department before placed into storage or use.

GLNs can be used in such cases to uniquely identify individual delivery points and the final destination of a product. This information can be provided in electronic commerce messages as well as appearing on the shipping label in a data carrier (e.g., barcode, RFID).

Internal stockholding locations, including equipment such as refrigerators or intelligent cabinets, can be identified by GLNs for inventory management purposes. If required individual refrigerators or other equipment can also be identified by other GS1 identifiers such as Global Individual Asset Identifier (GIAI) for asset management purposes such as recording planned maintenance, or GTINs

for product identification in an order to cash setting and supporting processes such as data synchronisation and traceability.

This information can then be used, in conjunction with other GS1 identifiers by external and internal supply chain operators to ensure that products are delivered to and stored in the correct location. This is essential as a particular item may be required urgently for an operation or other critical procedure and any delay in locating it may result in a patient safety issue.

This information is also critical for supporting product traceability and recall processes.

6.2   Physical location marking

Specific care should be given to label placement in physical locations. Below are actual label placement examples from hospitals in the UK. These examples are provided for illustrative purposes of actual practices at hospitals who are implementing GS1 standards.

- Labels should be located to ensure ease of scanning on entry to a room and should be sited as near to where relevant physical tasks are undertaken, as is practical

- Room labels should be placed just inside the entry at a height that is easily scanned and seen, probably alongside the light switch or fire alarm call point

- Labels should be placed on walls rather than on doors since doors can be replaced for maintenance. Labelling doors leading from one room to another can be confusing. However, care needs to be taken when walls are repainted.

- Bed space labels, if required, should be placed on the wall above the bed space.

- Cupboard labels, if required, should be placed on both the inside and outside of the cupboard

- In large rooms, such as corridors, there may be a need to apply more than one label. Where multiple labels are required, these may display the same GLN.

GLN label location

The examples below, of the UK's National Healthcare System (NHS) physical location labels, illustrate where a label may be placed in a room within a hospital.
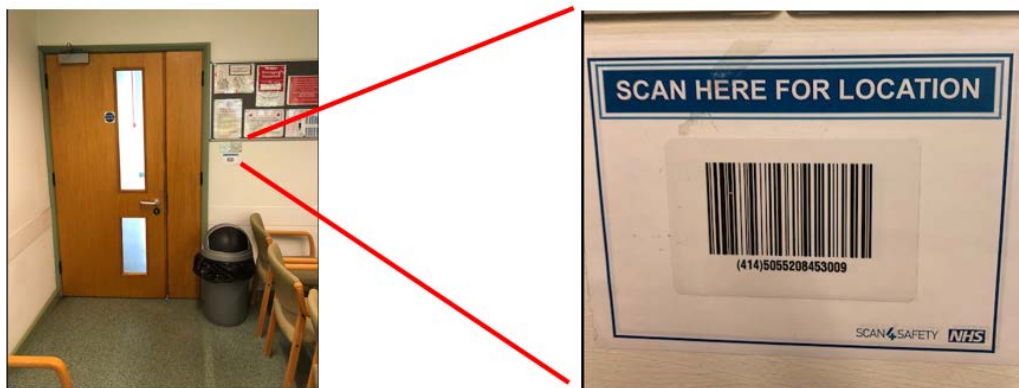
GLN label design

The examples below, of NHS physical location labels, illustrate that the label can contain existing human oriented information in combination with the GLN barcode.

Labels need to comply with Infection Control requirements and be sufficiently durable to withstand regular cleaning materials and practices.

6.3   GLNs in patient safety applications

GLNs can be used to uniquely identify both the physical location where an activity takes place (e.g., room 123) and the associated department (e.g., pharmacy department) or the function (e.g., dispensing counter #1).

The physical arrangements of hospitals change frequently. For example, a ward may move from one physical location to another to allow for cleaning, two rooms may be converted into one room or vice versa, or the function of a room may change from being part of physiotherapy to being an office or a storage location. GLNs can be used to both provide a history of what took place in that location, e.g., in which ward Mr. Smith was in and what was the physical location of his bed.

It is therefore recommended that:

1. Hospital physical locations should generally be identified by a GLN that simply identifies the physical location, e.g., room 21 in building 2, and does not specify the function or activity associated with the location.

2. Hospital departments and cost centres and other organisational entities or functions, should generally be identified by a GLN that simply identifies the function e.g., the X-Ray department or Ward -10 Geriatrics, and does not specify its current location.

3. A link should be maintained between the GLNs of physical locations and the GLNs of the functions or departments currently associated with those locations.

This approach ensures that when a clinic, ward or other function changes its location it is not necessary to change either the GLN identifying the function or the GLN barcode identifying the physical location. However, it does mean that when recording events, it may be necessary to register the GLNs of both the functional entity and the physical location.

6.4   GLNs in sterile equipment management

Effective decontamination and sterilisation of surgical instruments is a critical activity for every healthcare provider. This aspect is equally important when hospitals outsource decontamination operations to specialist service providers.

Many national healthcare regulators are mandating that each instrument and/or instrument tray must be uniquely identified and each use of the instruments and each decontamination activity is recorded. GLNs are used to support this process by uniquely identifying the locations where

instruments are used and stored such as theatre instrument store rooms, operating theatres and sterile service providers.

The use of GLNs in conjunction with GTINs (including serial numbers) and asset identifiers such as the *Global Individual Asset Identifier* (GIAI) will:

- Improve traceability and more efficient management of surgical instruments
- Increase the efficiency of resources in instrument tray assembly operations
- Improve availability and usage of instruments
- Used to track the location of instrument trays and endoscopes through the decontamination process to the storage area and on into theatres and back to sterile services
- Pinpoint contaminated areas vs needing to quarantine an entire hospital

6.5 GLNs in medical asset management

Clinical staff may spend unnecessary time looking for particular items of equipment such as wheelchairs, trolleys, patient monitors and infusion pumps. In addition, the lack of visibility leads to additional equipment being purchased or rented which increases costs and reduces asset utilisation.

To replace a manual search process with an automated asset tracking system, an increasing number of healthcare facilities have implemented real time tracking of medical equipment using a combination of GIAI identifiers attached to the equipment in conjunction with RFID tags, wireless networks and GLN codes.

6.6 Other GLN applications

GLNs can be used for:

- Identification of specific shelf locations where medical records are stored within a medical records storage facility. They can also be used to identify where records were sent and their current location.
- Inventory management and product recall: GLNs identify locations where products are stored including room, shelf, cupboard, cabinet or refrigerator
- Patient tracking and bed management: GLN identify wards, theatres, imaging departments –(X-Ray), recovery rooms and bed bays so that patient whereabouts can be unambiguously recorded and provided to consultants, bed managers, relatives and others
- Sample tracking: GLNs identify pick up points and laboratories reception so that sample location can be recorded accurately and in real time
- Dispensed Medicine tracking: GLNs identify pick up points, dispensaries and ward stock areas so that medicines can be recorded and tracked accurately and in real time
- Medical Equipment: GLNs identify equipment libraries, wards, theatres, clinics where medical equipment is located enabling the equipment to be located for planned maintenance or for reallocation to other users
- Adverse Event Analysis: GLNs provide clear and unambiguous identification of where events have taken place. This is valuable to hospitals when performing adverse event analysis
- Managing other services such as cleaning and maintenance: GLNs identify locations to be cleaned or containing equipment to be maintained.

Additional healthcare implementation scenarios can be found in the *GLN Allocation Rules document*.

7 GLNs in Mergers and Acquisitions (M&A)

Global Location Numbers serve a critical role in the identification of legal entities and physical locations associated or named in a merger or acquisition. This section provides guidance on how to treat GLNs in the event of a merger or acquisition.

The phrase mergers, acquisitions and divestitures (abbreviated M&A) refers to the buying (acquisitions), selling (divestiture, also known as divestment or divesture) and combining (merger) of all or part of different companies or businesses. M&A's are normally executed in order to aid, finance or help a company grow rapidly in a given industry. Whether a purchase or unification is considered a merger or an acquisition lies in how the purchase is communicated and received by the target company's board of directors, employees and shareholders.

Both the Buyers (companies who are acquiring or merging with another company or business) and Sellers (companies who are being acquired or merging with another company or business) will benefit from the use of a comprehensive implementation guideline outlining activities, processes and best practices required during a M&A with reference to managing and communicating GLN and supporting data with their trading partners (i.e. manufacturers, distributors, hospitals, pharmacies). They will need to work towards integrating the acquired company, division and/or products into the buyer's portfolio with minimal impact, address issues such as who maintains the right to use the GS1 Company Prefix(es) and the GS1 identification numbers (e.g., Global Trade Item Numbers (GTINs), Global Location Numbers, (GLNs), Serial Shipping Container Code (SSCC), etc.) assigned using the GS1 Company Prefix, when ownership of the product or company changes, and how these changes are communicated with the all their trading partners and GS1 Member Organisations (MOs).

Trading partners need M&A implementation guidance to:

- Ensure that subsequent use GLNs and associated master data is based on a consistent set of terminology and best practice processes, by both buyers and sellers

- Enable the buyers and sellers to outline key areas of responsibility and to determine what is expected, and what are acceptable results

- Provide the basis for an open relationship between buyers and sellers as well as an understanding of accountability by both parties

- Encourage commitment from both the buyers and sellers on key activities with a common understanding of expectations

- Contribute to a more timely and seamless M&A

This guidance will eliminate confusion on time-lines, reduce multiple meanings for terms and remove the uncertainty on the management and assignment of GLNs as well as promoting standardisation of present practices and bring uniformity to activities, processes and information.

Two general factors to consider regarding the transfer of a GLN:

- If the GLN identifies a location, function or legal entity that is part of the sale, then the GLN should be considered as part of the legal transfer. The opposite is also true.

- If the GLN identifies a Brand which will continue under the same name, then the GLN should be considered as part of the legal transfer. The opposite is also true.

Lastly, clear and timely communication of impacted GLNs should be communicated to the other side of the trading relationship in order to prevent confusion and errors in transactions and shipments.

A Appendix: Implementation success stories

This annex contain implementation success stories based on information previously reported via the GS1 Healthcare reference books and recent additions. The intention of this annex is to provide a summary of each implementation as reported and a link to where the entire business case can be found.

GLN Success Stories in Healthcare

1. Implementing Drug Traceability at Hospital Alemán in Argentina

Hospital Alemán, Argentina

Abstract:
In order to reduce the serious risks presented by the proliferation of counterfeit medicines, Hospital Alemán implemented a traceability system complying with the new legislation introduced by the National Administration of Drugs, Foods and Medical Devices of Argentina (ANMAT) in late 2011.

Purpose/issues:
Reduce the serious risks presented by the proliferation of counterfeit medicines
Counteract the distribution and supply of illegitimate drugs to guarantee patient safety

Benefits/findings:
All drug movements are recorded in real-time in a central database managed by ANMAT using Global Location Numbers (GLNs) to identify the various agents involved in the supply chain.

Reference: *https://www.gs1.org/sites/default/files/docs/casestudies/14_GS1_HC_RefBook2013_Aleman.pdf*

2. NSW Health continues to benefit from its implementation of GS1 standards

NSW Health, Australia

Abstract:
In 2005, NSW Health adopted GS1 Australia's Global Data Synchronisation Network (GDSN) compliant data pool, GS1net – known as the National Product Catalogue (NPC) in the Australian healthcare market – as its optimal and compliant solution to facilitate the exchange of accurate, timely and synchronised data across its supply chain.

Purpose/issues:
Manual processing of procurement information using several methods and from various sources.
These processes led to inaccurate, unreliable and variable sources of information and posed a deterrent to business growth. They were not conducive to system-to-system integration, essential for procurement process efficiencies.

Benefits/findings:
The NPC has enhanced the quality of data within the NSW Health procurement information system. The established processes by GS1 Australia provide system architecture improvement to ensure the solution is flexible in terms of accommodating industry endorsed additions and improvements over time. GS1 Locatenet, a central directory of GS1 Global Location Numbers (GLNs), enables the matching of NSW Health Location GLN to receiving Trading Partner GLN.

Reference:
GS1 Healthcare Reference book 2015/2016, Page 42,
https://www.gs1.org/sites/default/files/docs/healthcare/gs1_healthcare_reference_book_2015-2016.pdf

3. Ramsay Health Care getting the benefits of using GS1 standards

Ramsay Health, Australia

Abstract:
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.

Purpose/issues:
Improve the efficiency of its supply chain processes

Benefits/findings:
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.
Business messages are exchanged with suppliers using GS1 EDI XML standards containing the GTIN and GLN as primary identifiers for products and locations.

Reference:
GS1 Healthcare Reference book 2016/2017, Page 48,
_https://www.gs1.org/sites/default/files/docs/healthcare/gs1_rb2016_web.pdf_

4. Health Corporate Network leverages the GS1 System for eProcurement success

Health Corporate Network (HCN), Australia

Abstract:
Health Corporate Network (HCN), an organisation that delivers shared services, including supply, to the West Australian Department of Health identified an increase in the volume of paper procurement transactions being processed, placing a significant burden on staff. A decision was made to implement eProcurement using the NEHTA eProcurement Solution to automate some of the manual processing. The basis for NEHTA's eProcurement Solution is GS1's eMessaging Standard, GS1 XML combined with the Australian Standard (AS) 5023, which defines message data set and business rules for Healthcare. HCN was conscious that eProcurement processes must be based on accurate and complete product data, and so made the decision to mandate population of the National Product Catalogue (NPC) as a pre-requisite for implementing eProcurement with any supplier. A range of benefits have been realised since eProcurement implementation commenced and these will increase as the number of suppliers involved grows.

Purpose/issues:
The volume of paper procurement transactions being processed, placing a significant burden on staff

Benefits/findings:
These references (GTIN & GLN) ensure even suppliers processing orders manually know exactly which items and levels of packaging are being ordered by HCN and the correct locations to which the goods should be shipped. It further enhances the message that if suppliers publish their data to the NPC, HCN will access it and incorporate it into their procurement systems.

Reference:
GS1 Healthcare Reference Book 2011/2012, page 14,
_https://www.gs1.org/docs/healthcare/GS1_Healthcare_Reference_Book_2011-2012.pdf_

5. Transforming the Canadian healthcare supply chain: creating the future roadmap for success

CareNET, Canada

Abstract:
Describes the efforts that are underway to create a standardised healthcare supply chain in Canada, affecting change and eliminating obstacles that have prevented full adoption in the past. Recent developments will accelerate the creation of one of the most modern supply chain systems in the world, with the full involvement of the government, healthcare provider (i.e. hospital), supplier, group purchasing organizations (GPO), and service provider communities.

Purpose/issues:
To achieve a standardized, efficient healthcare supply chain.

Benefits/findings:
Using global standards – such as Global Trade Item Numbers (GTINs) and Global Location Numbers (GLNs) for product and location identification, respectively – throughout the supply chain will enable track and trace systems and automated product recall systems. Industry-adopted attributes and the exchange of clean data between trading partners will ultimately become entrenched in healthcare systems and drive efficiencies.

Reference:
GS1 Healthcare Reference Book 2009/2010, page 51,
https://www.gs1.org/docs/healthcare/GS1_Healthcare_Reference_Book_2009-2010.pdf

6. **Modernising the pharmaceutical product supply chain in Hong Kong public hospitals**

Hospital Authority, Hong Kong, China

Abstract:
In 2010, the Hospital Authority began its Supply Chain Modernisation project with the aim to achieve two main goals: firstly, to enable the track and trace capability in its handling of the large volume of pharmaceutical products through the adoption of industry standards including unique item identification as well as electronic data messaging protocols; secondly to achieve operational efficiency in the supply chain management process. These goals were successfully achieved in 2013 with the full collaborative support from the major pharmaceutical distributors.

Purpose/issues:
To enable the track and trace capability in its handling of the large volume of pharmaceutical products; to achieve operational efficiency in the supply chain management process.

Benefits/findings:
Significant improvement in the workflow efficiency with much enhanced pharmaceutical product traceability and has paved the way to benefit medication and patient safety in the clinical care process.
Supply Chain Modernisation project provides an accurate tracking of products from one location to another through the use of the GLN. The Hospital Authority is now able to harness supply chain visibility through the use of GS1 GTINs for products, SSCCs on logistical units, GLNs for delivery locations, and despatch advices for delivery notifications.

Reference:
GS1 Healthcare Reference Book 2014/2015, page 34,
https://www.gs1.org/docs/healthcare/GS1_RB2014_web.pdf

7. **How GLNs Contribute to the Standardisation Efforts at Charité University Hospital**

Charité University Hospital, Germany

Abstract:
Realising the importance of identifying the location as accurately and precisely as possible, Charité University Hospital decided to implement GS1 Global Location Numbers (GLNs) for accounts/locations as an essential step in its efforts to fully support the adoption of healthcare supply chain standards.

Purpose/issues:
To identify the location as accurately and precisely as possible

Benefits/findings:
The GLN is used to uniquely identify locations and legal entities from manufacturers, distributors, and hospitals, all the way down to nursing stations. Transaction errors are then reduced while ensuring that the right product, procedure, and/or treatment are delivered to the right location.
The use of GLN brought important improvements to the healthcare supply chain:

- Clean data on delivery locations and therefore reduced error rate (by considering the correct internal and external delivery address)

- More accurate purchase orders and invoicing processes

■ Real-time access to GLNs – always up-to-date using GEPIR and the recommended processes

Reference:
GS1 Healthcare Reference Book 2013/2014, page 23,
https://www.gs1.org/docs/healthcare/13_GS1_HC_RefBook2013_All.pdf

8. Safer Surgery Saves Lives

GS1 Identification and bar code standards deployed in the Irish Health Service Executive's (HSE) Central Decontamination Units (CDUs)

Irish Health Service Executive's Central Decontamination Units Ireland

Abstract:
The Health Service Executive (HSE) is the government agency responsible for the provision of public healthcare services for everyone living in Ireland. The HSE now requires that all surgical instrument trays are identified using GS1 Standards to enable stakeholders to track and trace them throughout the supply chain. The system currently being rolled out is designed to create a collaborative, interoperable, and nationwide traceability solution for Central Decontamination Units (CDUs).

Purpose/issues:
To reduce manual labour, increase efficiency and create assurances that an effective decontamination process has occurred.
Global Location Numbers (GLN) are used to identify the location of the Central Decontamination Units that has decontaminated the surgical instrument set and its contents.

Benefits/findings:
One of the biggest benefits identified is the ability to loan instruments seamlessly between the eight hospitals currently participating in the initiative

Reference:
GS1 Healthcare Reference Book 2013/2014, page 25,
https://www.gs1.org/docs/healthcare/13_GS1_HC_RefBook2013_All.pdf

9. DDS Pharmacies optimise clinical care and improve elderly patient safety through GS1 Electronic Data Interchange

DDS Pharmacies, the Netherlands

Abstract:
By using global standards for electronic business messaging for rapid, efficient and accurate automatic transmission, the use of GS1 Standards has helped pharmacists, general practitioners and nurses in the Netherlands to safely treat patients who live in nursing homes or at home. The newly implemented GS1 eCom *(current name GS1 EDI)* Standards improved the ordering process between the dispensing pharmacies and the patients' community pharmacy, paving the way for new patient safety and logistic opportunities.

Purpose/issues:
To enhance their functionality to better support their processes and to improve the current electronic message used in the ordering process.

Benefits/findings:
EDI now allows for a DDS order and DDS order response, based on the GS1 eCom *(current name GS1 EDI)* standards for order and order response with the use of Global Trade Item Number (GTIN) identifying each drug and Global Location Number (GLN) identifying the physical location of the drug and/or the legal entities (nursing home, pharmacy).

Reference:
GS1 Healthcare Reference Book 2014/2015, page 38

https://www.gs1.org/docs/healthcare/GS1_RB2014_web.pdf

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

Derby Teaching Hospitals, UK

Abstract:
Derby Teaching Hospitals NHS Foundation Trust wanted to better manage product recalls as well as streamline its theatre processes. 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 (GIAIs) and Global Location Numbers (GLNs), respectively. By using those 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.

Purpose/issues:
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

Benefits/findings:
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.

Reference:
GS1 Healthcare Reference Book 2016/2017, page 20,
https://www.gs1.org/sites/default/files/docs/healthcare/gs1_rb2016_web.pdf

11. UK Department of Health's eProcurement Strategy makes NHS more efficient and safer

Department of Health, UK

Abstract:
In August 2013, the Department of Health published Better Procurement, Better Value, and Better Care, which established a new Procurement Development Programme for the NHS England (National Health Service). This document contains the commitment that "we will mandate, through contracts, the use of GS1 Coding in the NHS." The purpose of the Programme is to help NHS trusts stabilise their non-pay spending so that they spend no more than they currently do by the end of 2015-16, thereby realising £1.5bn of procurement efficiencies.
In effect, everyone providing goods and services to the biggest public healthcare system in the world will be required to identify their products and services using GS1 identification keys (GTIN and GLN) and then to share master product data with the NHS through a GS1 compliant data pool.

Purpose/issues:
To enable NHS trusts to control and manage their non-pay spending by:
- using master procurement data
- automating the exchange of procurement data, and
- Benchmarking their procurement expenditure data against other NHS trusts and healthcare providers.

Benefits/findings:
This strategy is an important element of a wide ranging programme of work to deliver between £1.5 billion and £2 billion of savings by the end of 2015-16 to keep a balanced NHS budget and to continue to provide a quality service for patients by protecting the front line. It will also support business to innovate, and help to make the NHS a more transparent and better place in which to do business.
The Global Location Number (GLN) serves a key role by identifying all suppliers as part of the overall procurement process.
Reference:

GS1 Healthcare Reference Book 2014/2015, page 51,
https://www.gs1.org/docs/healthcare/GS1_RB2014_web.pdf

12. Achieving 'Perfect Order' and beyond

BD & ROi, US

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

Purpose/issues:
The industry has been challenged by disparate proprietary data for medical devices and location information. Data translations and manual processes cause a multitude of errors and create an insidious obstacle to achieving the desired future state of efficiency or implementing specific clinical systems and programs.

Throughout the BD/Mercy/ROi collaboration, GLNs were utilised to unambiguously identify locations and further reduce transactional errors. ROi and BD continue to transact with the GLN today, and are each working with other partners to implement GLN going forward.

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

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

Reference:
GS1 Healthcare Reference Book 2012/2013, page 33,
https://www.gs1us.org/DesktopModules/Bring2mind/DMX/Download.aspx?command=core_download&entryid=605&language=en-US&PortalId=0&TabId=134

13. BJC HealthCare GS1 Standards Implementation Case Study

BJC HealthCare, US

Abstract:
This case study details how BJC HealthCare successfully worked with GHX and GS1 Healthcare US to implement global industry standards in business transactions with suppliers and other healthcare trading partners. Today, BJC is using GLNs in all of its purchase orders transmitted through the GHX exchange and is prepared to transact with GTINs as its vendors enumerate their products with this standard.

Purpose/issues:
To automate the process of tracking products from the point of manufacture to the point of use in order to help improve patient outcomes and reduce supply chain costs

Benefits/findings:
To date, BJC HealthCare has derived the following benefits from GLN enablement:

- Improved data accuracy

- Reduced billing and shipping errors
- Greater process efficiency

Reference:
https://www.gs1us.org/DesktopModules/Bring2mind/DMX/Download.aspx?Command=Core_Download&EntryId=600
GS1 Healthcare Reference Book 2011/2012, page 54,
https://www.gs1.org/docs/healthcare/GS1_Healthcare_Reference_Book_2011-2012.pdf

14. Louisiana hospital system achieves the "touchless order" via GS1 standards implementation

Franciscan Missionaries of Our Lady Health System (FMOLHS), US

Abstract:
Franciscan Missionaries of Our Lady Health System (FMOLHS) is currently engaged in a two-year pilot to develop a high performance, streamlined and automated supply chain, in large part via the implementation of GS1 standards. Like many hospital systems, FMOLHS aims to eliminate human error and bad data while putting into place supply chain processes that are automated from end-to-end - from the time an order is placed through its materials management information system (MMIS), to the delivery of the product, use of the product at the patient bedside and accurate recording of the product in the patient's electronic medical record. In 2014, FMOLHS achieved what was previously considered by the U.S. healthcare industry as "mission impossible" – it processed the Touchless Order with zero errors, and has since replicated the process with additional suppliers.

Purpose/issues:
To eliminate human error and bad data

Benefits/findings:

- The Global Location Number (GLN) is the standardised location identifier that replaces custom account and location numbers.
- Accuracy in purchase order, invoicing and payment.
- Revenue reporting factors (charge accuracy, claims processing efficiencies, real-time product usage and consumption, automated replenishment, demand-driven supply chain, and point-of-use systems and processes).
- Inventory management (value of inventory on hand, reduction in inventory, relabelling activities, recalls, expiration date management).

Reference:
GS1 Healthcare Reference Book 2015/2016, page 37,
https://www.gs1.org/sites/default/files/docs/healthcare/gs1_healthcare_reference_book_2015-2016.pdf

15. Seton Family of Hospitals and BD Use GS1 Standards and Processes to Reduce EDI Errors in Pursuit of "Perfect Orders"

Ascension Health and BD, US

Abstract:
Both Ascension Health and BD believed that alignment of master data was necessary for accurate transactions and was a pre-requisite for Perfect Orders. They also wanted a solution that could be shared and utilized with other trading partners. Therefore, Ascension Health and BD set out to implement GS1 standards to ensure alignment and accuracy; specifically, GTIN (product ID), GLN (location ID) and GDSN (product attribute data).

Purpose/issues:
Ascension Health manages pricing & product information for 445 locations. Accurate product information in systems and transactions is essential in order to maintain sufficient, reliable supply levels for "just in time" inventory management.

Benefits/findings:

- No Unit of Measure EDI Errors
- No Confusion or Errors on Ship-To Locations
- Perfect Alignment on Contract Eligibility

■ No Synchronization "Work Around" Processes

■ One Source for Product Data

■ Clarity on Manufacturer ID

■ Provides Accurate Product Descriptions

Reference:
https://www.gs1us.org/DesktopModules/Bring2mind/DMX/Download.aspx?Command=Core_Download&EntryId=514

16. Mayo Clinic and Cardinal Health partner to implement GLNs for patient safety and supply chain efficiency

Mayo Clinic, US

Abstract:
In July 2008, Mayo Clinic and Cardinal Health collaborated to implement the GS1 GLN as their sole account/location identifier. Both organisations agreed that the GLN project would be an innovative first step toward the 2010 GLN Sunrise.

Purpose/issues:
To replace custom account numbers in order to reduce costs and improve patient safety. Mayo Clinic firmly believes that supply chain data standards will greatly improve healthcare safety and efficiency, supporting their primary value that "the needs of patients come first."

Benefits/findings:
Price accuracy improves with location identification accuracy. Location identification errors can cause loss of discount eligibility as well as tier qualification and rebate disputes.
Price accuracy for Mayo Clinic and Cardinal Health is currently 99.5%, whereas the average supplier accuracy is 95%.

Superior price accuracy is attributed to not only GLN, but also to the commitment that both organizations make to price integrity and associated improvement efforts.

The use of GLNs improves supply chain management performance, and GLNs used in conjunction with other GS1 standards promise even greater performance. Similarly, the more supply chain partners that adopt GS1 standards, the greater the benefits for the entire industry.

Reference:
GS1 Healthcare Reference Book 2010/2011, page 24,
https://www.gs1.org/docs/healthcare/GS1_Healthcare_Reference_Book_2010-2011.pdf

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

BD, Mercy & ROi, US

Abstract:
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.

Purpose/issues:
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.

Benefits/findings:
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

Reference:
GS1 Healthcare Reference Book 2016/2017, page 55,
https://www.gs1.org/sites/default/files/docs/healthcare/gs1_rb2016_web.pdf

18. Print Media, Inc. Levelling the Playing Field

Print Media, US

Abstract:
Print Media developed a GS1 standards-enabled business process by implementing Global Location Numbers and the GLN Registry for Healthcare.

Purpose/issues:
Create an efficient and accurate process to trace, verify and report thousands of sales transactions per day.

Benefits/findings:

- **Enhanced productivity.** Print Media has gained dramatic productivity improvements; what once took four weeks, now takes one or two days.

- **Improved cash flow.** The new process facilitates order-to-invoice accuracy, reducing errors and speeding cash flow.

- **Increased revenue.** Print Media can easily enter new markets and conduct business with any GPO, distributor or healthcare provider.

- **Greater customer satisfaction.** Using GLNs and analytics, Print Media tracks customer buying levels and trends to offer customers greater value.

Reference:
https://www.gs1us.org/DesktopModules/Bring2mind/DMX/Download.aspx?Command=Core_Download&EntryId=606&language=en-US&PortalId=0&TabId=134

19. STERIS Corporation: Right Products to the Right Places at the Right Times

STERIS, US

Abstract:
STERIS created a cross-functional team led by a project manager to focus on GLN implementation. They used tools and educational opportunities from GS1 Healthcare US for best practices and support.

Purpose/issues:
To optimize the supply chain for customers and ensure even greater patient safety

Benefits/findings:

- **Reduce costs** by getting the right products to the right locations at the right times, eliminating potential re-works and saving associated transportation and labor costs.

- **Improve cash flow** by facilitating order-to-invoice accuracy, reducing errors and speeding cash flow.

- **Increase productivity** by getting STERIS representatives the information they need to make quicker and better decisions. With improved order-to-invoice accuracy, they can focus on other business priorities.

- **Enhance customer satisfaction** by gaining greater visibility of products moving throughout its supply chain. STERIS can efficiently respond to Customers' requests and speed products to destinations.

- **Improve patient safety** by supporting its Customers' patient safety initiatives to get the right products in the right locations at the right times for proper patient treatment.

Reference:
https://www.gs1us.org/DesktopModules/Bring2mind/DMX/Download.aspx?Command=Core_Download&EntryId=606&language=en-US&PortalId=0&TabId=134

19. How Intermountain Healthcare Successfully Took Ownership of its GLNs and is Embracing GS1 Standards

Intermountain Healthcare, US

Abstract:
After receiving GLNs from GPOs many providers struggle with the next steps of GS1 implementation. Intermountain took this challenge and went full speed ahead to create a successful roadmap for other organizations to follow by creating an organizational hierarchy to validate and reconcile GLNs and beta testing GLN transactional data with a small group of suppliers.

Purpose/issues:
To take ownership of its GLNs to improve efficiencies, reduce costs and enhance patient safety.

Benefits/findings:

- Improved operational efficiencies

- Reduced costs

- Enhanced patient safety

Reference:
http://www.intalere.com/Amerinet%20Documents/How%20Intermountain%20Healthcare%20Successfully%20Took%20Ownership%20of%20its%20GLNs%20and%20is%20Embracing%20GS1%20Standards.pdf

20. GS1 standards enable an integrated sterilisation management system for University of Fukui Hospital Surgical Centre

University of Fukui Hospital, Japan

Abstract:
Since 2014, the University of Fukui Hospital (Fukui Hospital) had focused on the cost-effective management of its surgical operations by using GS1 standards. The hospital has successfully achieved the traceability of surgical instruments in its surgical centre's sterilisation process by identifying each of 20,000 instruments with the GS1 Global Individual Asset Identifier (GIAI), encoded in a laser-engraved GS1 Data Matrix barcode. To date, Fukui Hospital has reduced the error rate along with the time required when assembling instruments for surgical operations by 2,000 hours per year. Fukui Hospital is the first hospital in Japan to use GS1 Global Location Numbers (GLNs) to identify each of its locations.

Purpose/issues:
To enhance patient safety and the quality of infection control.

Benefits/findings:
By using GLNs as part of its surgical container setting system, Fukui Hospital has helped reduce overall operation time by 500 hours per year.

Additionally, the management of steel instruments directly marked with GIAIs and the management of locations using GLNs have not only contribute to ensuring traceability on individual steel instruments, but also saved a total of 2,500 hours work time annually. This allows nurses to concentrate on other duties, and furthermore, can contribute to a reduction of their overtime work.

Reference:
GS1 Healthcare Reference Book 2017/2018, page 29,
https://www.gs1.org/sites/default/files/docs/healthcare/gs1_hcreferencebook_17-18.pdf

21. State-of-the-art hospital relies on GS1 standards for highly efficient and safe ways to work and care for patients

University Hospital Aarhus, Denmark

Abstract:

Constructing one of the largest hospitals in northern Europe has required a new approach to support process improvements and traceability. Five hospitals have merged to one hospital, and the new hospital now covers nearly 500,000 square meters. The hospital has 10,000 employees treating about 1,000,000 patients each year.

State-of-the-art technology has been a requirement for this transformation that has been more than ten years in the making.

Purpose/issues:

To create a foundation of global GS1 standards for innovation and technology adaption in a modern hospital.

Benefits/findings:

Today, each location in the hospital is identified by a GLN. A minimum level of usage is the exchange of GLN information between systems, yet a high level of metadata and location context information is available for systems. On top of the location database, a wayfinding system adds routes, making it possible to be guided to a location based on its identifier. Wayfinding guides are made available to patients before their arrival at the hospital to ensure a positive experience. With global standards in place, including EPCIS, the hospital can now easily locate the people and assets it needs to provide patients with timely and safe care.

Reference:

GS1 Healthcare Reference Book 2017/2018, page 12,
https://www.gs1.org/sites/default/files/docs/healthcare/gs1_hcreferencebook_17-18.pdf

22. Dijon Centre Hospitalier Universitaire (CHU): early adopter of the use of GS1 standards and identifiers in a hospital

Centre hospitalier Universitaire Dijon, France

Abstract:

The logistics platform of the CHU of Dijon opened in April 2009 and traces all of its internal deliveries using the GS1 standards. This application covers all the products received and delivered to the hospital, and more precisely health products. The platform traces internal deliveries, and needs to receive dispatch advices from suppliers and get SSCC on cartons and pallets. To ensure the traceability of internal deliveries, the CHU of Dijon has therefore identified all the places of departure, arrival and storage of the products using GLN - Global location Number. This includes 1,700 beds and nearly 6,000 GLNs.

Additionally, the delivery bins are individually identified with a GRAI - Global Returnable Asset Identifier. Handlers are identified by a GLN, this application having been put in place before the adoption of the GSRN - Global Service Relation Number for Healthcare applications.

Purpose/issues:

To ensure complete traceability of deliveries from the platform to the units of care, to monitor the stock of each unit of care, to make a targeted batch recall in the care units received product concerned.

Benefits/findings:

Overall, there are 30% fewer stocks in the facilities. All products received on the platform are recorded and stored with a GTIN, batch number and expiration date. All deliveries record the GTINs, lot number and expiration date (in FIFO=first in first out mode), Batch setback (security) and Time saving in case of withdrawal alert trigger

This results in a 60% decrease in inventory in the healthcare units with a half on the central stock of the platform for better responsiveness.

A 50% reduction in the number of storage places in the new hospital's care units, resulting in a 30% increase in the area devoted to care.

Reference:
http://xchange.gs1.org/sites/hcstudies/Pages/University-hospital-of-Dijon---France0802-9071.aspx

23. Indian Insurance Informatics Bureau (IIIB)

Hospitals in India

Abstract:
Signed a MoU early March to develop a National Hospital Registry using GLNs. The Registry will be the trusted source of reliable healthcare information in the country and will be accessible to various stakeholders including healthcare insurance companies, governmental bodies, regulators and beneficiaries.

Purpose/issues:
Build a single source of reliable, updated and authenticated information on location/contact details, treatments, and costs, etc. Each hospital is uniquely identified.

Benefits/findings:

- Avoid duplicity;

- Visibility and transparency to treatment costs for validating insurance claims;

- Enable future tariff fixing of treatments to standardise healthcare costs in the country;

- Streamline the health insurance process to speed up insurance claims settlement and handling of fraudulent claims;

- Build global visibility of Indian healthcare facilities, services and capabilities for international patients;

- Enable interoperability with other GS1 Healthcare registries;

- Enable greater analytical and reporting to drive decision making by various stakeholders in the healthcare insurance industry.

- A 50% reduction in the number of storage places in the new hospital's care units, resulting in a 30% increase in the area devoted to care.

24. Plymouth Hospitals NHS Trust GLN implementation journey

Hospital the UK

Abstract:
Plymouth Hospitals NHS Trust is the largest hospital in the South West Peninsula. They have a secondary care catchment population of 450,000 with a wider peninsula population of almost 2,000,000 people who can access their specialist services. The use of Global Location Numbers (GLNs) for location numbering is one of the core enablers of the Department of Health's (DH) eProcurement strategy. By introducing GLNs now, Plymouth are making sure they're on track with DH plans for compliance with GS1 standards.

Purpose/issues:
The Trust's property management system was supplied by Micad, a GS1 UK Industry Partner, and contained 6,715 locations. The room numbering conventions weren't consistent and, where the numbers themselves were attached to the doors rather than the location, this led to problems when doors or doorframes were removed or relocated. This created extra work renumbering locations when doors were moved and looking for locations that had no number label at all. The inconsistent numbering system also made it difficult to find locations without a floor plan. Also, there was little or no consistency across different software systems, with the same location being referred to differently in each system. The replication of data also introduced the potential for information to be stored incorrectly for example, when a cost centre changed, this information wasn't cascaded to other systems.

Benefits/findings:

The Trust introduced GLNs as a way of managing their locations in a cost-effective and consistent way. The GLN provides a unique number to every location, and this will eventually allow the Trust's property management system to route information to the other systems with no manual involvement. The next stage will be to make sure that the high priority in-Trust systems are all using GLN identifiers (the Trust has around 240 systems in total) with associated interoperability benefits.

How did GS1 standards help?	What are the benefits?
Standardisation across systems	Inter-operability between systems using locations
Barcoded labels available in every location	Time saving - staff can scan the barcode instead of manually entering data
Using GLNs standardised the naming and labelling conventions for Plymouth physical locations	Removes time spent looking for incorrectly labelled rooms Less ambiguity around ownership and occupancy of locations
All areas now have a barcode associated to a physical location	Some locations could not be identified before
Up to date registry	The Trust has a complete record of its spaces with governance to ensure future compliance

Reference:
https://www.gs1uk.org/~/media/documents/marketing-documents/gs1_uk_healthcare_success_stories_plymouth_gln_case_study.pdf?la=en

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Additional examples where GLNs play a role

1. eProcurement at St James's Hospital, Dublin

St James's Hospital, Ireland

Abstract:
In 2013, St James's Hospital (SJH) embarked on a proof-of-concept (POC) project in conjunction with a number of suppliers to automate the end-to-end ordering process. The objective of the POC was to fully standardise and automate the ordering process between the hospital and the supplier. The process replaces paper-based systems and provides direct links between financial and clinical systems. The globally unique GS1 identification keys for products and locations are at the heart of this solution enabling automation and traceability. In September 2014, St James's Hospital went live with their first supplier, Cruinn Diagnostics. SJH now invites all suppliers to join the programme (which is based on the full adoption of GS1 standards).

Purpose/issues:
To fully standardise and automate the ordering process between the hospital and the supplier

Benefits/findings:

- Improved patient safety with consequential reduction in duplicate patient procedures

- Increased ability for accurate traceability and recall

- Standardisation and increased accuracy of product information

- Elimination of inefficient paperwork and duplication of data input

- Reductions in stock holdings and level of waste stocks

- Reduction in number of credit notes generated

- Automatic invoice matching

- More efficient utilisation of supply chain management and finance resources.

Reference:
GS1 Healthcare Reference Book 2015/2016, page 23,
https://www.gs1.org/sites/default/files/docs/healthcare/gs1_healthcare_reference_book_2015-2016.pdf

2. **Change has finally come: U.S. Healthcare industry to implement common data standards to improve safety, reduce costs**

Premier, US

Abstract:

Product information in the U.S. healthcare supply chain is inconsistent and inaccurate. Currently, the industry suffers from the lack of a systematic way to consistently identify distinct medical/surgical products, which negatively impacts the rest of the supply chain, including the quality of care delivery for patients. With e-commerce now defining the day-to-day business processes in the healthcare setting, the healthcare industry must leverage technology advances to create a more efficient and effective supply chain, to reduce unnecessary costs and to improve patient safety.

Purpose/issues:

To bring about greater efficiencies, reduce costs and improve the quality of patient care

Benefits/findings:

In healthcare, the three GS1 standards will help electronically describe important information needed to effectively move and track a product throughout the supply chain. They will also help communicate that information between different information systems within a hospital, or between a hospital and supplier, at any point in the supply chain and in any direction.

Reference:
GS1 Healthcare Reference Book 2009/2010, page 9,
https://www.gs1.org/docs/healthcare/GS1_Healthcare_Reference_Book_2009-2010.pdf

Refer to the *Glossary* on the GS1 website for a complete listing and definition of terms.