Achieving World Class Patient Safety and Efficiency in Irish Healthcare

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This Whitepaper documents the work conducted by

St. James's Hospital in conjunction with

their suppliers and key trading partners.

The work is based on a best practice procurement model

for Irish Healthcare which automates the

order to payment cycle utilising global standards.

St. James's Hospital

January 2015

Version 2

"Patient safety is at the core of our mission at St. James's Hospital. Adoption of global standards contributes to patient safety, improved efficiency and reduced cost in everything we do, everybody wins. These standards and associated technologies enable the automation of processes at the hospital. This is the right thing to do for our patients and builds on the long standing relationship with the GS1 organisation."

Brian Fitzgerald, CEO St. James's Hospital

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1. Background

St. James's Hospital is the largest acute academic teaching hospital in the Republic of Ireland and provides a comprehensive range of diagnostic and treatment hospital services to a population in excess of 300,000 at local, regional and national level. As well as national and regional services, other services include the National Burns Unit, National Maxillo Facial Surgery Unit, Bone Marrow Transplant, ENT / Head and Neck Surgery, Vascular Surgery and Cardiothoracic Surgery.

St. James's Hospital is a voluntary hospital, with its own governing body, the Hospital Board, reporting directly to the Minister for Health. There is a strong academic commitment with Trinity College Dublin through the Trinity Health Sciences Centre located on site. This houses the Medical School, Postgraduate Medical Centre and the hospital's Centre for Learning and Development.

St. James's Hospital has developed by the blending together of different traditions - traditions which give the hospital pride in its past and confidence in its future.

2. St. James's Hospital's Vision, Purpose and Values

Vision	To be a leading healthcare organisation, nationally and internationally; improving health outcomes through collaboration and innovation.
Purpose	To provide the best care to every patient through our personal and shared commitment to excellence in clinical practice, education, research and innovation, while fostering our partnership with Trinity College Dublin.
Values	**Patients matter most to us.** We provide care that is safe, effective and accessible so that our patients achieve the best possible outcomes and experiences of care. **Respecting people** – being kind and honest, promoting diversity, collaboration, personal and professional development. **Innovating and sharing knowledge**– we learn, teach, research and innovate to improve health and well-being. **Using resources wisely** – delivering value, working efficiently and protecting the environment.

3. Executive Summary

"Global Standards could help save thousands of lives and billions of dollars each year"

"Universally accepted methods for identifying products and locations and exchanging data could enable organizations to share vital information along the entire value chain, eliminating today's broad array of custom data configurations, while improving compatibility and interoperability, reducing redundancy, preventing medication errors, enhancing visibility, and enabling seamless, automated information exchange among supply chain partners."

McKinsey, Strength in Unity, October 2012

St. James's Hospital is committed to improving patient safety and to making the appropriate investments in world class systems and processes which will contribute to achieving this objective.

The Hospital believes that the development and implementation of comprehensive, end-to-end integrated business processes and systems based on industry best practice standards is the only way to ensure that the twin benefits of patient safety and hospital efficiency are achieved. The application of such an approach to the hospital's processes is a long and multi-phased undertaking.

To date, this approach has been very successfully implemented in the areas of haemophilia treatment and in the tracking of surgical devices - both national programmes. These solutions have proven that the use of international standards significantly enhance patient safety, traceability and accuracy across the healthcare pathway. The ***Haemophilia Treatment Tracking Solution*** is now globally recognised as an exemplar of supply chain efficiency and patient safety, providing certainty of product identification and effective and efficient product recall. The ***Surgical Instrument Tracking Project*** has enabled the introduction of better traceability and higher instrument pack throughput with fewer resources, replacing paper with automation and enabling inter-hospital tracking.

Since 2008, St. James's has been extending this approach to the automation of ***Procurement of Medical Supplies***. In 2013, the hospital embarked on a proof-of-concept (POC) exercise in conjunction with a number of its suppliers to automate the end-to-end ordering process. This exercise has built on the work of previous years of systems automation. The objective of the POC was to fully standardise and automate the ordering process between the hospital and the supplier, based on the principles of single entry / multiple access for shared product information. The process replaces paper-based systems and provides direct links between financial and clinical systems. The Proof of Concept exercise is described in this white paper.

The best practice procurement model achieved through the POC is ground-breaking and requires the full commitment of both healthcare providers and vendors. The core principle in this solution of employing a common, shared product catalogue has long been recognised and espoused as best practice but this is the first implementation of its kind globally, incorporating four standardised electronic transactions from the start thereby enabling a fully open and integrated solution from supplier to the hospital.

This automated procurement process delivers administrative and cost benefits such as increased accuracy, removal of inefficient paperwork and duplication of data input, reductions in stock holdings and waste, increased visibility of all stock holdings, standardisation of product information, reduction in stock management resources and a reduction in nursing oversight of stocks among other benefits.

However, it is in the area of improved patient safety with the consequential reduction in unnecessary, repeated and costly procedures that the major benefits are realised. In order to realise these benefits the hospital believes that this eProcurement initiative is the best approach.

The set up costs for the implementation of this model principally related to SJH system modifications, the engagement of an EDI service provider and participation in the product catalogue. Ongoing systems costs are expected to be no greater than current system running costs and will achieve further savings as the system is extended**. The next step is the extension of this solution to all suppliers thereby making the system the standard way of doing business with St. James's Hospital.** The costs involved in this extension are largely in the area of on-boarding additional suppliers.

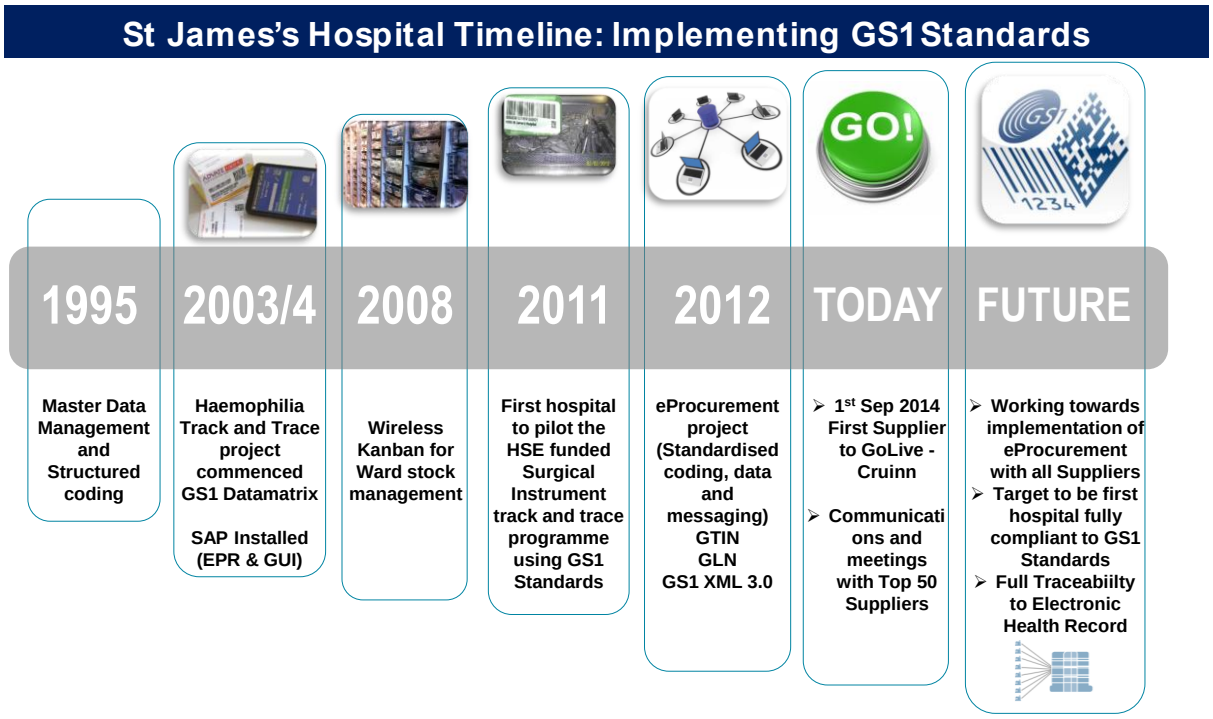
The future potential benefit for St. James' Hospital is to migrate to a comprehensive solution which will see the automated tracking and assurance of all medical devices and supplies to patients.

Following the successful completion of the POC with three Suppliers, SJH conducted an internal review and received approval to proceed with full implementation of this new business model. The requirement for compliance to GS1 Standards (see diagram 4) is now included in tenders and SJH is working to engage their key suppliers in this programme.

Additional hospitals will be accommodated in the solution without the need for further central systems development and without duplicating common product data. Similar interfaces would be required between the solution and the financial systems of other hospitals where different financial systems are in use.

All of this development has direct relevance to other hospitals in Ireland. Substantial elements of the solution, including the product catalogue could be shared with other institutions and the wider public sector resulting in considerable benefits.

Diagram 1



Evolution of Supply Chain Management and Procurement at St. James's Hospital

St. James's Hospital has been committed to the development of supply chain management and procurement over the past two decades. The diagram above is a graphical representation and highlights the adoption of GS1 Standards as the final stage of excellence for supply chain management and procurement. This diagram illustrates the milestones achieved by St. James's Hospital on the path towards full adoption of GS1 Standards for increased patient safety, improved efficiencies and traceability.

See Appendix 2 for more details of the Hospital's implementation path

4. The Proof-of-Concept Approach

4.1 Objective

The objective of the Proof-of-Concept (POC) was to automate and standardise the ordering process between St. James's Hospital (SJH) and its suppliers for products and services starting with medical devices. This was based on the principle of single entry / multiple access for shared product information while additionally removing paper based systems. Direct links were created to the hospital's financial system and ultimately to various clinical systems. These links provide full visibility to all parties of stocks and the movement of patient critical product in the hospital supply chain.

Following on from the successes of both the Haemophilia and Instrument tracking projects and the patient safety benefits realised by both, the team at SJH set about applying the same principles to improving patient safety in the procurement process.

The hospital undertook a global benchmarking survey of best-in-class healthcare transformation initiatives that utilised global standards. The aim was to build on the experience gained from these resilient solutions. The challenges faced in Australia mirrored many elements of the Irish healthcare market. The Australian solution identified low levels of standardised product codes, a lack of standardised data and an absence of standardised electronic transactions. The learnings from this standards-based national approach were taken to develop the best practice eProcurement model for Irish healthcare and to establish a Proof-of-Concept (POC).

The POC was based on the establishment of a National Product Catalogue and an end-to-end eProcurement solution with GS1 standards at its core. This would assist in establishing the key learnings for the Irish market and create a working model that would be scalable across Irish healthcare to support adoption at a national level. The POC was successfully concluded at the end of 2013.

The vision for the POC was to establish and prove the 'touch-less order' concept and build a working model that would be scalable across the SJH supplier base and beyond. Another aim was to build the foundations which support the hospital in its patient safety objectives in terms of traceability to the patient record.

The core elements of the POC were:

1) The adoption of an international coding standard for the identification of medical supplies

2) A single data repository for the hospital (which can also form the basis of a national product catalogue to be shared with other hospitals/state agencies)

3) The exchange of standardised electronic transactions with suppliers to enable the flow of goods and documents with minimum human intervention, thereby eliminating all paper in business processes

4) Development of the relevant infrastructures and process to enable the convergence of business and clinical systems to improve patient safety.

4.2 The Solution

St. James's Hospital, together with its suppliers, implemented the eProcurement solution using accurate Master Data shared by the Supplier through the National Product Catalogue (NPC) and deploying four electronic business transaction messages exchanged via Electronic Data Interchange (EDI). Accurate product data is critical not only for supply chain efficiency but also for clinical purposes to support patient safety. The four EDI messages eliminate the need for paper and increase the speed and accuracy of procurement transactions.

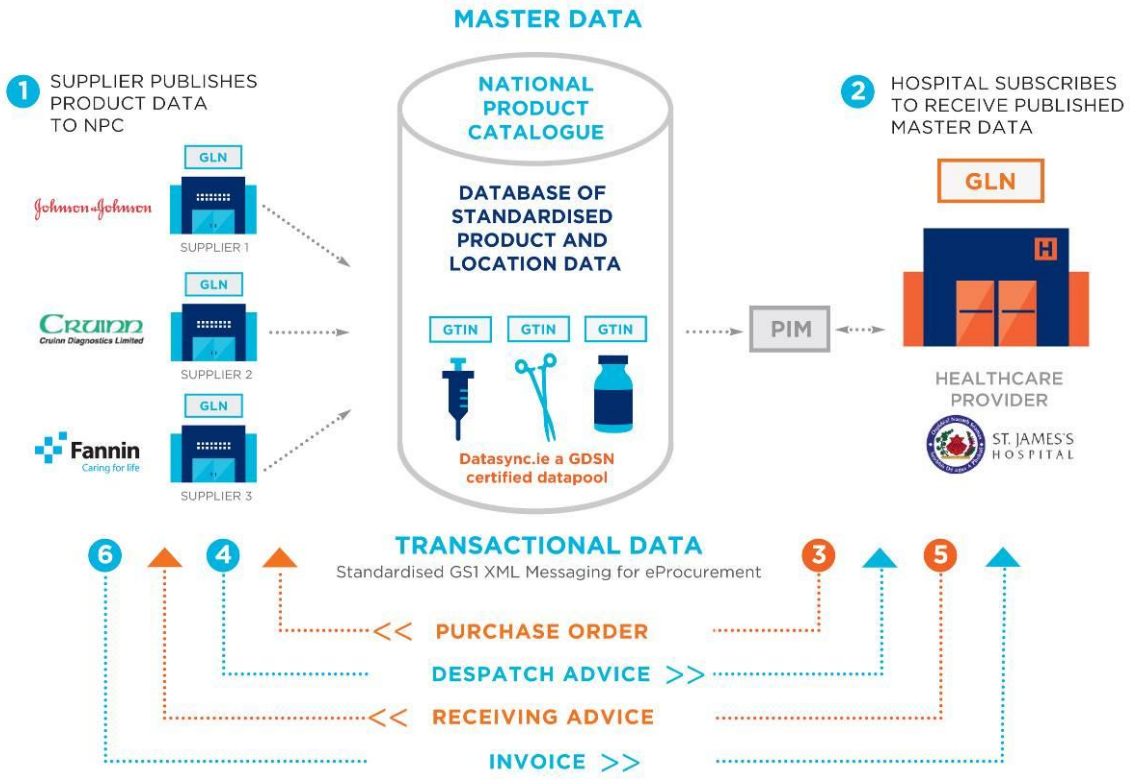
A minimum dataset of the key attributes (eg: brand name, weight, unit of measure, MRI compatibility etc) associated with the products was agreed with SJH and suppliers were requested to provide the corresponding master data via the NPC (See Appendix 3).

The hospital leveraged the following GS1 Identifiers and Standards for use in the POC:

- The Global Trade Item Number (GTIN) for standardised identification of products (often but not always printed as a barcode on the product)
- The Global Location Number (GLN) for standardised identification of locations
- The Global Data Synchronisation Network (GDSN) for standardised sharing of Master Data via the National Product Catalogue (NPC)
- The GS1 XML messages for standardised exchange of business transactions messages (Purchase Order (PO), Advance Shipping Notice (ASN), Receiving Advice Notice (RAN) and Invoice (INV))

Diagram 2

eProcurement Model - ***Master Data and Electronic Message Flows between the Hospital and Suppliers***



Description:

This diagram illustrates the eProcurement model put in place by St. James's Hospital.

The first step in the process is the publication of master data by the Suppliers to the National Product Catalogue. This data, such as product ID, quantity or unit of trade, is key to the successful exchange of the electronic procurement messages and full automation of the order to cash cycle.

In step 2, the product data is maintained by SJH via the PIM (Product Information Manager).

Finally in steps 3 to 6, the transactional data is exchanged via EDI incorporating the purchase order, advanced shipping notice (or despatch advice note), receiving advice note and finally the invoice.

4.3 National Product Catalogue

The National Product Catalogue (NPC) is a single shared data repository which the supplier updates and the hospital can retrieve information from. This eliminates the current effort of re-keying data and will ultimately standardise and improve the quality of data being exchanged within the Irish health system. The supplier can share this data with any trading partners that are set up on the NPC and approved to receive data. The NPC provides a direct link between the supplier and the hospital. In the case of SJH, the hospital already has a strong internal coding and classification system which utilises National Supplies Vocabulary (NSV) codes. The POC provided the final step in linking the hospital to the supplier by using the Global Trade item Number (GTIN) i.e. the barcode on the physical product, as the key.

Product Information Manager (PIM)

The Product Information Manager is a fundamental component of the National Product Catalogue. The PIM is a software tool which allows SJH to centrally manage its standardised supplier master data. The PIM is used by SJH to link and manage Supplier data imported from the NPC to the internal ERP system.

At the time of new product introductions, the data from the NPC is imported to the PIM and presented to the SJH master data administrators. This data is matched to the internal ERP data using the GTIN or other search criteria in the product matching utility.

Once correctly matched the data is then taken into the SJH ERP system via a direct download from the PIM. Further updates to the data involving multiple attributes are managed in a consistent, accurate and timely manner with minimal human intervention.

Ultimately this allows supplier data to be populated in the hospital ERP system via a controlled and automated machine-to-machine process with no re-keying of data.

Master Data Setup (Step 1)

The first key requirement for St. James's Hospital was the alignment of product and price data with their suppliers at product setup stage in advance of the ordering process; this also ensures accuracy of the data between the hospital and the supplier.

- The supplier determines if GS1 Identifiers (GTINs) are available for each item supplied to SJH
- The supplier maps the GTINs to their product listing
- Master data elements such as product name, description and unit of measure are collected by the supplier according to the dataset agreed with SJH.
- The master data is then uploaded by the supplier to the National Product Catalogue
- SJH requests to receive the Suppliers product data from the NPC and so a relationship is established which allows the supplier to update SJH of any changes to this data
- Using the Product Information Manager (PIM) SJH reviews the supplier data and matches it to the internal hospital data
- SJH takes the data into their ERP system via a direct download from the PIM.

4.4 Transactional Data Exchange

Electronic Data Interchange (EDI)

EDI is the electronic exchange of business information using an agreed standardised format; a process which allows one company to send business messages such as purchase orders and invoices to another company electronically, rather than on paper. EDI based on global standards allows the messages to be exchanged quickly, efficiently and accurately between trading partners

Electronic Messaging (Step 2)

SJH's second requirement for electronic messaging eliminates paper based, error-prone processes by allowing automated electronic communication of the transactional data between the hospital and supplier. All messages are exchanged in GS1 XML Standard format. Both SJH and the suppliers complete the ERP integration work so that the messages flow between the hospital and the supplier without any human intervention.

Once the master data was setup in the SJH ERP system the hospital worked with the selected suppliers on the electronic message development. For this process SJH engaged with an EDI provider, Atlas Products International, to facilitate the exchange of four key standardised procurement messages. The electronic messages are:

- Purchase Order
- Advance Shipping Notice
- Receiving Advice Notice
- Invoice

Data Exchange and Translation Tool

To facilitate the exchange of messages between the SJH ERP system and their EDI partner Atlas Products, a hosted translation solution was implemented for the hospital to enable electronic trading with its partners.

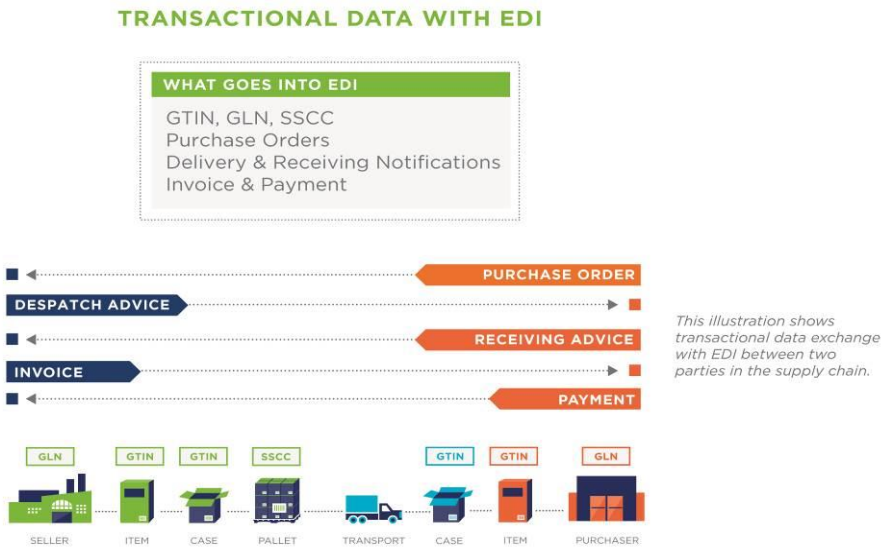
- The solution is integrated with the hospitals ERP system via basic files for the designated messaging types. The back office data is routed between Atlas and SJH via a secure connection.
- The data is either placed or collected by the hospital into the relevant folders to allow the Atlas component to process it.
- Three unique connector profiles were created to accommodate routings to each ERP environment in SJH.
- The data is routed to each trading partner via the Atlas connector and AS2 (standard specification for secure transportation of data).
- This means that a traditional value added network (VAN) and its associated charges have not been required.

The Four eProcurement Messages

SJH utilised industry standard EDI messages to define an eProcurement message dataset for Irish healthcare. GS1 Ireland was engaged to support this development. Part of the POC process was to enable the exchange of these four messages in a standard format between the ERP of SJH and the ERP of the supplier i.e. machine-to-machine, utilising the standardised data from the National Product Catalogue (NPC). **Central to the eProcurement process is the use of the GS1 Identification Keys for Product (GTIN) and Location identification (GLN) within the four messages. This allows for the harmonisation of data that is unambiguously recognised, interpreted and understood by all parties.**

Order to Invoice using the GS1 GTIN and GLN Identifiers

- The first key step was the establishment of a secure two-way messaging gateway. The second step was the translation of the Hospital ERP messaging to the GS1 XML format providing a common message format for all parties to exchange
- SJH generated the EDI Purchase Order from SAP that is transmitted (following translation to XML by Atlas) to the supplier. The translation to the common format is applied to each subsequent message
- Upon receipt of the order the supplier prepares the order for shipment and responds with an EDI Advance Shipping Notice (ASN) which includes the details of the goods shipped to SJH
- On receipt of the goods, SJH warehouse staff compared the delivery to the information in the ASN. To confirm receipt of goods an EDI Receiving Advice Notice (RAN) is sent to the Supplier
- The Supplier generates an EDI Invoice based on the information in the RAN to initiate the payment process and transmits to SJH



5. Execution of the Proof-of-Concept

5.1 Supplier Involvement

For the Proof-of-Concept (POC), St. James's Hospital worked with a sample of products from four suppliers – Johnson & Johnson, Synthes, Medtronic and Cruinn Diagnostics Ltd. – representing 15% by value of SJH suppliers. A minimum dataset was agreed and the suppliers were requested to provide the corresponding product master data via the National Product Catalogue (NPC). Despite the fact that these suppliers were leading global manufacturers this too was a new departure for them in realising true end-to-end traceability based on international standards.

5.2 Project Management

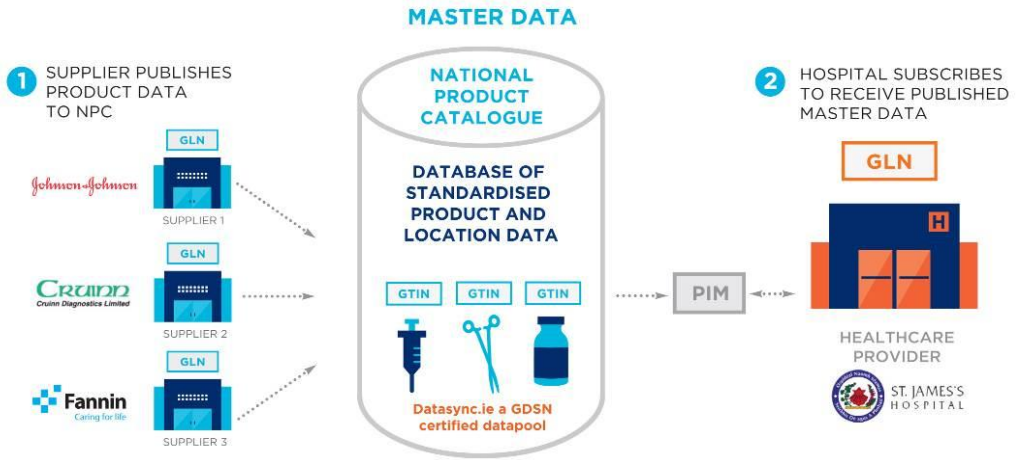
One of the key drivers for success was the weekly project call with each supplier where each of the Stakeholders (SJH clinical and non-clinical staff, GS1, Supplier, Atlas Products and the supplier EDI provider) were in attendance. This ensured that any issues were picked up and addressed in a timely fashion. A Project Manager from GS1 Ireland was appointed as the neutral facilitator for the project. The POC commenced in 2012 with a face-to-face kick off meeting with all Stakeholders and was completed by the end of 2013. The system went live and became operational for the first Supplier in September 2014.

5.3 The SJH Approach

It was imperative that once the Hospital was committed to investing in the project that a pragmatic approach was adopted to minimise cost and risk. The cost implications of a number of approaches were examined.

Considerable work went into establishing a machine-to-machine connection between the SJH ERP system (SAP) and the National Product Catalogue so that the supplier's product master data can be accepted by SJH without any rekeying activity.

For full details please see Appendix 1 for an explanation on the work with SAP and the tools used to take the suppliers' data from the National Product Catalogue (PIM, Product Information Manager).



5.4 Technical Implications for Suppliers

Costs in this area are dependent on the capability and constraints of each trading partner. The intention is to keep the barriers to entry at a minimum in terms of on-boarding suppliers. The main consideration is that they can send and receive data to and from external agencies (EDI Provider). The supplier would also need to be able to maintain GS1 code mapping within their systems. The options for vendors range from fully integrated ERP solutions to third party external portals. Each case needs to be examined in terms of the most optimum solution. It may be the case that a supplier already has EDI set up with other trading partners and will want to add SJH to their current setup. Other suppliers may want to buy EDI software from an EDI provider and add SJH as an EDI partner.

If the supplier doesn't have the capability to integrate with an EDI Provider, there are also options for messages to be exchanged via a web portal service. Typically suppliers will receive orders from their customer and "flip" the order into an invoice that they send back. Other EDI messages can also be incorporated as necessary.

5.5 Change Management

SJH decided to develop four transactional messages for the proof-of-concept. Each of these messages had differing change management and training implications. There were no costs over and above normal working time factored in to retraining. This may not be the case for suppliers who may have to deal with differing levels of process change along with operational and technical support. Each supplier will have different capabilities and circumstances. SJH will work with and assist all suppliers during the on-boarding process through to go-live.

Purchase Order

The hospital currently sends the majority of its purchase orders to its supplier base in the form of a PDF document attachment in an e-mail. The procurement team were familiar with EDI messaging.

Advanced Shipping Notice (ASN)

This was a new process because it involved an electronic goods receipt document created by reference to an inbound delivery to SJH (ASN). The inbound delivery number is contained in the EDI message and is referenced on the physical document accompanying the actual delivery of the goods.

Receiving Advice Note (RAN)

This transaction is automatically created once the goods receipt is confirmed. No user intervention is required. The only training implication was that users needed to be aware of it. There are change management implications for the supplier as this is a radical departure from standard processes, particularly in the Irish market. In many cases an invoice would have been simultaneously created and sent at the same as the delivery note was produced. The RAN creates a new requirement for suppliers to wait until they receive the RAN before they create an invoice.

Invoice

The invoice process will be completely automated as no discrepancies should arise due to the preceding RAN transmission. The invoice, if correct, will post automatically in the background. There will no longer be a requirement for physical supporting documentation to be sent. The only reference that will appear will be on the supplier's statement of account. The hospital will no longer require its staff to receive, scan, validate, process and reconcile invoices.

6. Results

The hospital now has a working automated purchase-to-pay solution which it is now extending to other suppliers.

> *"The order was placed first thing this morning, the goods arrived mid-morning and the invoice was on the payment run in the afternoon with no manual intervention. The speed and accuracy of the whole process was incredible, a first for Irish healthcare"*
>
> ***Pat Bailey, SAP MM Lead, SJH***

The operational system is confirmed to have the following features as a result of the work conducted during the POC

- Single, open, central repository of product data currently shared between SJH and its suppliers
- This data is automatically synchronised with the St. James's ERP (via Product Information Management tool)
- The standard procurement process is now automated between the SJH ERP and the suppliers' ERP systems for those suppliers that are engaged in the process
- The solution is paperless
- This solution provides full traceability and oversight of stocks
- This is a framework other hospitals and public sector organisations can use
- The use of standards creates the foundation for cross sector data analytics

Overview of Implementation Steps towards world class patient safety and efficiency in Irish healthcare

Move from Paper to Standardised Electronic Processes

EVOLUTION	Standardised Procurement Transactions	Automated Goods Receiving	Inventory Management	Full Traceability to the Patient
1995 - 2003	√	X	√	X
2004	√	X	√	Haemophilia only
eProcurement proof of concept	√	X	Ward Stock & Stores	Haemophilia and Instruments
Integrated Procurement	√	X	Ward Stock, Stores Consignment Stock	√
Interoperability Financial & Clinical Systems	X	X	X	X
Integrated eHealth Services	X	X	X	Haemophilia only

Diagram 3 **-** This diagram is an overview of the implementation steps towards world class patient safety and efficiency in Irish healthcare.

7. Lessons learned

From the start of the project it quickly became apparent that this will become the new way of doing business for SJH. Therefore considerable work was undertaken by all stakeholders involved in order to establish a model that is scalable, future proofed, standardised and interoperable.

The learnings established during the project were used to develop the final dataset and business rules which resulted in the first supplier achieving Go-Live with St. James's Hospital in September 2014.

- It is important that time is spent to ensure that the product data to be used as part of the EDI process is accurate and up to date. The data coming from the supplier needs to be accurately mapped to the local hospital system. The mapping of data to the GDSN data structure is a once off exercise.
- It is critical that the unit of measure at both product and trade unit level is aligned between hospital and supplier at product catalogue setup stage. Successful execution depends on this. Alignment on the unit of trade is an issue today which leads to many issues in the purchase to pay process. Moving to the new model would help address this.
- All processes should be tested end-to-end to ensure conformance to existing business rules in each organisation and to guarantee successful Go-Live.
- Issues arising during the testing phase should be dealt with as they arise in order to guarantee successful Go-Live.
- All parties (SJH, GS1, supplier, EDI provider, ERP provider) must agree to a collaborative and co-operative approach and sign up to an agreed project plan with milestones

8. The Benefits Case, Costs and Return on Investment

St. James's Hospital embarked on this exercise in the strongly held belief that end-to-end process design and adherence to international standards is the best approach to delivering patient safety. The hospital considered this to be the only viable approach to increased patient safety through procurement. However, the approach, while being generally espoused as best-in-class, was unproven in its form as a complete solution.

The benefits were known to be considerable and included:

- Improved patient safety with consequential reduction in duplicated patient procedures and accurate traceability and recall
- Increased accuracy of product information
- Elimination of inefficient paperwork and duplication of data input
- Reductions in stock holdings
- Reduction in the levels of waste stocks

- Reduction in Conflict Resolution and Query Management
- Reduction in number of credit notes generated
- Increased visibility of all stock holdings
- Standardisation of product information
- Reduction in stock management resources
- Automatic invoice matching
- More timely payments for suppliers
- More efficient utilisation of supply chain management and finance resources.

The principal concerns in the exercise were the cost and the workability of the solution. The POC has established that the approach works, and that such a model can be implemented at an affordable cost. The full benefits will be realised over the next number of years and are in part dependent on the model being adopted by other hospitals in both the public and private sectors. The Return on Investment is generally between 6 and 9 months depending on the volume of transactions and the number of products.

This is the case today in many countries around the world and the HSE has expressed its intentions to adopt GS1 Standards.

9. Next Steps

Following the successful completion of the POC with three suppliers (DePuy Synthes was acquired by J&J during the project), SJH conducted an internal review and gained approval to proceed with full implementation of this business model. The requirement for compliance to GS1 Standards (Diagram 4) is now included in tenders and SJH is working to engage with key suppliers in this programme.

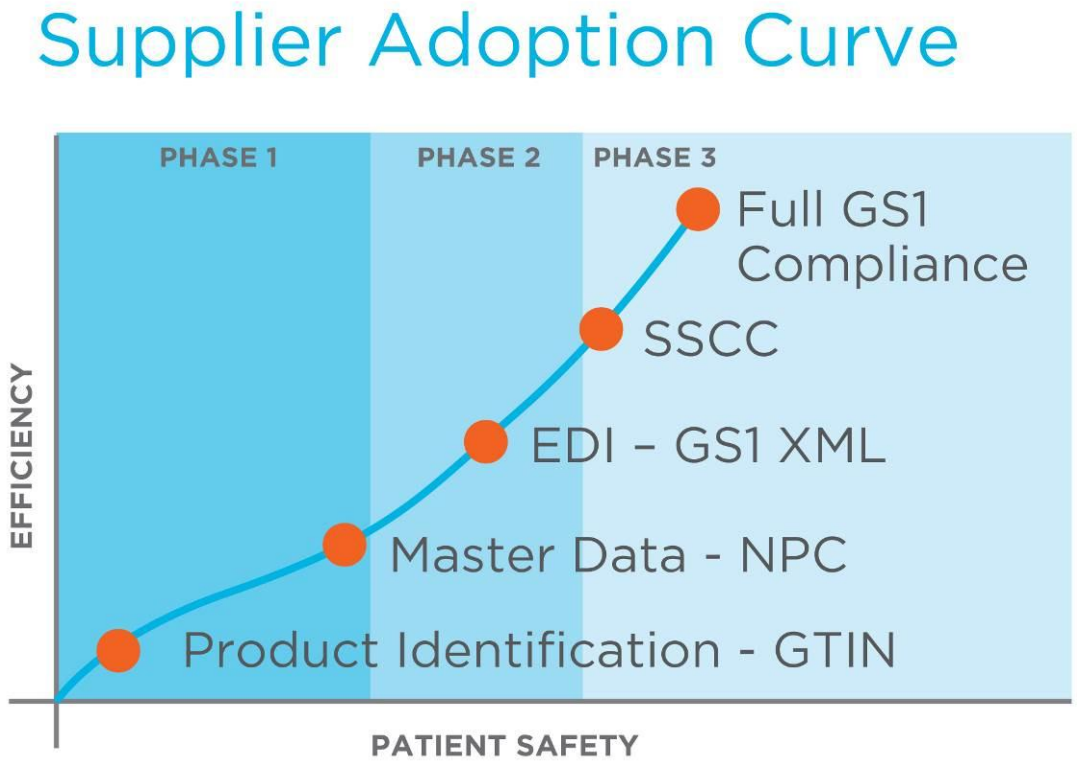


Diagram 4 – Supplier Adoption Curve

Current Status

Cruinn Diagnostics Ltd. was the first supplier to Go-Live in September 2014. J&J are committed to supporting SJH and this will be their first implementation in Europe using GTINs and GLNs for procurement purposes. Medtronic is also working towards Go-Live.

> *"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. In addition, it provides the means to converge clinical and business systems which supports the 'money follows the patient' model."*
>
> ***Vincent Callan, Director of Facilities Management, SJH***

St. James's Hospital has appointed a project manager to support the on-boarding of the next round of suppliers. A letter announcing the success of the POC and the intention of SJH to proceed with this business model has now been shared with their Top 60 Suppliers and a note has also been included in all Purchase Orders being issued by the hospital inviting suppliers to get involved.

Note – The following text is now included in all Purchase Orders being sent out from St. James's Hospital:

> Help to improve patient safety and drive down supply chain cost with SJH and GS1. For more information go to: http://www.gs1ie.org/healthcare/getstarted

Once the first phase of the rollout has become established, the hospital will proceed with the next phase which will address the automation of goods receiving. This is enabled using the GS1 Identifier called the Serialised Shipping Container Code (SSCC). The SSCC is applied by the supplier and is used for the standardised identification of pallets or boxes. A scan of the SSCC barcode in the warehouse will retrieve the corresponding Advance Shipping Notice, advising the warehouse staff of what is included in the shipment. This allows the warehouse staff to send an acknowledgement to the supplier of goods received (known as the Receiving Advice Notice (RAN)) which in turn prompts the creation and transmission of the Invoice.

10. Broader Public Sector Applicability

This initiative is an opportunity for the Irish government to provide leadership by adopting industry best practices, based on GS1 Standards as part of the Health Reform Measures. Regulation will drive much of this change. Furthermore, this is an opportunity to lead and for Irish SMEs to have a competitive advantage when engaging both locally and in other markets.

11. International Experience for Adoption of GS1 Standards

11.1 Australia

The National E-Health Transition Authority (NEHTA) Supply Chain Programme has been transforming the use of information in the healthcare supply chain. Since 2005 their initiatives include introducing a **unique and unambiguous identifier** for all medicines, medical devices and healthcare consumables (Global Trade Identification Number or GTIN), **global location identifiers** (Global Location Number or GLN) and the **National Product Catalogue (NPC)**, a central repository of accurate, standardised information about healthcare products from large medical devices to consumables and medicines. These are based on the global GS1 System of supply chain standards administered by GS1 Australia.

NEHTA initiated the National Product Catalogue (NPC) which has been operational in the healthcare sector since 2006. There are currently close to 300,000 GTINs (Products) in the NPC, utilised by more than 400 healthcare suppliers, wholesalers, distributors and public and private healthcare institutions, seeking to deliver improved patient safety and realise significant efficiency gains.

Having established this international catalogue in accordance with global standards NEHTA are now rolling out the electronic messaging infrastructure to implement full end-to-end procurement processes.

For more information please go to: http://www.nehta.gov.au/our-work/supply-chain

11.2 New Zealand

The New Zealand government has also recently adopted the same strategy as Australia. Health Benefits Limited (HBL) is a crown owned company that was formed in July 2010. HBL's purpose is to work together with the health sector to deliver sustainable world-class support for New Zealand health services. They do this by identifying opportunities that individual or small groups of DHBs would find difficult to achieve alone.

A key enabler for HBL's (Health Benefits Limited) business objectives is the creation of a District Health Board National Catalogue (DHBNC) to support procurement activities across the district health boards, as well as provide accurate core product data for DHB's business and clinical systems.

" The National Catalogue is a key enabler to the work Health Benefits Limited is doing with all District Health Boards in New Zealand" Nigel Wilkinson, Chief Executive, HBL.

For more information please go to: http://www.hbl.co.nz/Benefits (see DHB National Catalogue)

11.3 Netherlands

In 2008, the *Nederlandse Federatie Universitair Medische Centra* (NFU) made a policy decision to choose GS1 Standards to increase patient safety and to improve supply chain efficiency. The NFU, comprising of members of the eight Boards of Governors of the university medical centres in the Netherlands, have decided to implement structural improvements, leveraging the international system of GS1 Standards.

Following on from this policy decision they hope to build on the work done in a number of hospitals in the area of tracking implants and surgical instruments to the patient record in theatre.

In this regard, considerable progress has been made in a number of hospitals in the Netherlands to trace and link the products and equipment used on the patient in theatre to the patient record and they are now embarking on a local initiative to establish a National Product Catalogue.

11.4 United Kingdom

In May 2014, the Department of Health in the UK published their eProcurement strategy which requires all suppliers to adopt GS1 Standards to support the improvement of procurement processes.

Prior to the publication of the eProcurement Strategy the Department of Health released a document titled: '*Better Procurement Better Value Better Care: A Procurement Development Programme for the NHS*'. Below is an excerpt from the document.

"The McKinsey report *Strength in Unity* identified recurring savings of £3 million and £5 million for a 600 bed acute trust, based on full implementation of global GS1 standards. As part of this strategy, we will:

- mandate through contracts the use of GS1 coding for the NHS
- create a single NHS GS1 data pool for the NHS to use in its systems
- centrally invest in enabling Product Information Management and Messaging technologies
- create a single 'data warehouse' for NHS procurement data
- define standards to ensure interoperability between e-Procurement systems
- establish standards for datasets and classification
- put implementation support arrangements in place for trusts to draw upon."

Procurement Development Programme for the NHS, August 2013

For more information please go to: https://www.gov.uk/government/collections/nhs-procurement

In November 2014, Jeremy Hunt MP Health Minister launched the '**NHS Goes Digital**' document:

GS1 will be a fundamental enabler of this framework in practice (below is an excerpt)

"viii. The GS1 standard, which includes the unique identification of patients, products and places, as well as Radio Frequency Identification (RFID) tagging, makes a well-evidenced contribution in health and care. This international standard has been shown to improve patient safety and quality of care by minimising the risk of errors occurring, and is also used for more effective and efficient supply chain management, resulting in significant cost savings. In order to maximise the opportunity that technology offers to promote safe care and productivity, NHS England will, with the HSCIC, develop a joint approach to implement the GS1 standard across the health and care system."

For more information please go to: https://www.gov.uk/government/publications/personalised-health-and-care-2020

Appendix 1 – Background to SJH Approach

SJH system modifications and interfaces

SAP ECC/ERP central component is SAP's suite of standard business software. St. James's Hospital runs the latest version of the system. A certain level of support for EDI transactions and EAN/UPC (GS1) master data is provided as standard.

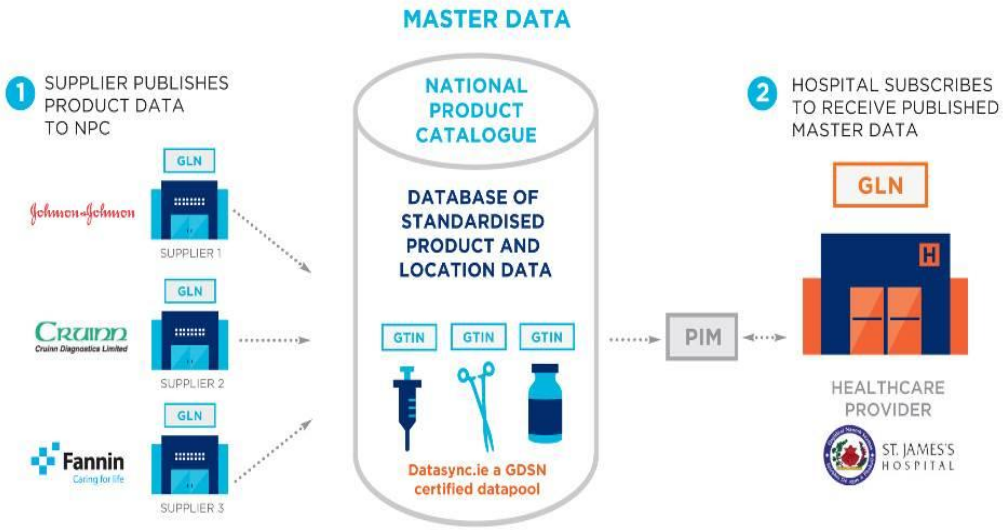
Master Data

It was decided that following a review of the cost and time implications that the Hospital would adopt the following approach:

- The existing SAP ECC functionality was deemed sufficient and would be used to maintain GTIN and GLNS for material and vendor master data respectively
- A custom table was created in order to maintain GLNs for corporate level, storage location and ordering point Identification
- The standard IDocs file (format that SAP uses to interface with other systems) for Purchase Order creation, Advanced Shipping Notice, Receiving Advice Note and Invoice posting were amended to incorporate the necessary GS1 elements.

Electronic Data Exchange

SAP also provides software components that facilitate the exchange of data between SJH and the diverse operating systems and applications used by external partners. External parties would probably use varying forms of connectivity, protocols and file formats. However, in order to minimise risk, the Hospital chose Atlas Products International as a service provider to handle the necessary mapping and secure translation and transmission of IDocs to GS1 XML 3.0 and vice versa for whatever native formats were used by the hospital's suppliers. The solution provider also demonstrated, in the context of the proof-of-concept project, the interoperability that exists between multiple EDI solution providers.



Product Information Tools and Identifiers

GS1 Ireland indicated that they possessed the necessary in-house expertise to develop a Product Information Manager (PIM) that would incorporate a product matching utility. The PIM is the primary interface between the NPC (Datasync.ie/'GDSN Certified' Data Pool) and the SJH SAP ERP system. Suppliers, which may be local or international, upload their data to their respective data pools linked to the GDSN network. These are linked to Datasync.ie which is the GDSN certified data pool for Ireland. The PIM is a cloud based solution. The GS1 Product Matching Utility (PMU), a feature of the PIM is an application designed to manage the cross-matching of the products in the SAP database with those in the GDSN database. The PMU is a standard Microsoft Windows application, built using Microsoft VB .Net Framework 3.5.

NPC Data Alignment Mechanism

The Hospital created a custom transaction that exports a .csv file containing relevant existing product data that is picked up by the PIM. This updates the list of SAP-stored products in the Product Matching Utility (PMU – module which is part of the PIM), and the system automatically generates a new work-flow list identifying if there are any new products which need to be matched. Once any amendments are made to the data, either by importing new products, accepting product amendments, or matching products, the system prompts the operator to create a new export file. This file, which also contains defined attributes for the product, is then imported by another bespoke SAP database application, and used to update a custom table in SAP with the content of the export.

Appendix 2 – Background on Patient Safety initiatives

The Procurement Environment and Patient Safety

In the international arena it has long been accepted that, a single source of product master data and a global registry based on international standards allows fast, accurate transmission of data from manufacturers to customers. The network can provide continuous, automated access for authorised parties and ensure that accurate, consistent product information is available among supply chain partners. This capability can streamline and accelerate business processes, improve accuracy in processing orders, and ultimately reduce cost. By incorporating clinical information into the master data, patient safety is also improved.

These principles have been applied in a number of pilots and implementations around the world. However the deployment often stops at the level of interoperability with the supplier systems and processes.

The St. James's Hospital solution is built on these principles and standards, learning from international experience and applied in a full end-to-end solution that can be used by both national and international suppliers.

Previous Patient Safety Projects employing International Standards

In recognising the importance of Patient Safety there are two working examples already in place in Ireland which demonstrate full end-to-end traceability. In both cases patient safety was the key driver however, the additional benefits of increased efficiency, visibility and cost savings have also been proven.

The National Haemophilia Project

In response to the findings of the Lindsay Tribunal in 1999 the National Centre for Hereditary Coagulation Disorders (NCHCD) put in place an international standards based solution to track and trace medication from the manufacturer right through the healthcare supply chain to the patient. This project harnessed the use of medication barcode scanning and a mobile phone application (app) to improve patient safety, verify patient self-administration, optimise individual patient treatment and reduce costs.

"The future is definitely going to be about the tracking and tracing of medicine based on International (GS1) Standards".

Dr Barry White, Consultant Haematologist, NCHCD

Patients use large amounts of medication which has to be ordered, delivered, and most importantly, administered according to the five "rights" (right patient, right drug, right quantity, right route, right time). The NCHCD therefore modelled the delivery of haemophilia medication on the retail supply chain which is based on global standard barcode identifiers (GS1) and incorporated the use of a mobile phone app to enable patients to record the administration of medicine in the home. All clotting factor medication was labelled with a barcode, containing key information including product number (to verify the correct product), batch traceability (in the event of recall) and expiry date (to manage inventory).

Barcode scanning automates the previous manual tasks required by the patient to record medication, which in turn increases recording compliance and accuracy.

Critical components in the solution were

a) an IT system for administering the Electronic Patient Record (EPR)
b) a barcoded cold chain delivery service ensuring the correct drug is prescribed to the right patient
c) the automatic updating of the inventory system to track patient consumption trends.

The roll-out of the solution, including the implementation of an electronic patient record (EPR), a validated cold chain supply service and international standards, has contributed to huge cost savings in the Haemophilia track and trace system with product waste [1] significantly reduced. The patient identifier in particular helps minimise patient ID errors in the care delivery process.

This world class solution has been in place since 2003 and continues to be the reference model for other similar traceability applications and supports over 240 patients in Ireland who have severe haemophilia and require home treatment.

HSE National Surgical Sterile Instrument and Endoscope Tracking Solution

Following a successful pilot at St. James's Hospital in 2011, the HSE made the decision to rollout a

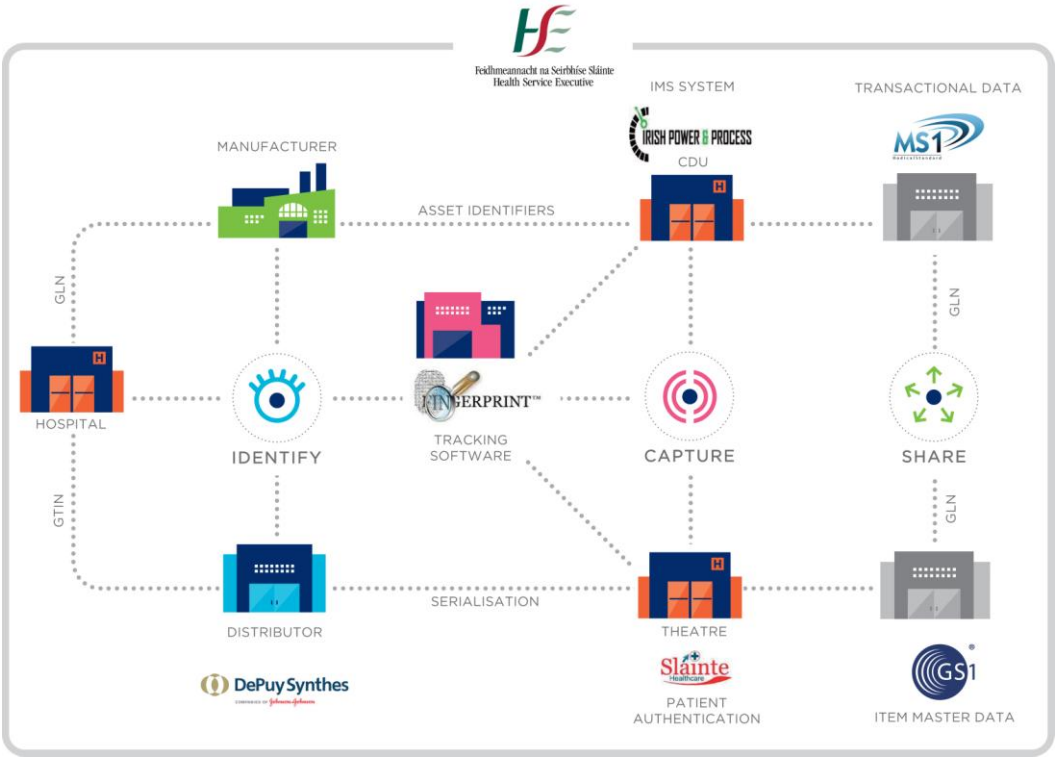
[1] *€700k was saved in 2011 through stock rotation*

tracking system for reusable medical instruments on a national level. The system has been implemented in over 40 HSE Hospitals around the country and the rollout is ongoing. The project was further extended in 2013 to include the tracking of endoscopes.

Sharing reusable instruments such as endoscopes between theatres and hospitals has obvious cost-saving and availability benefits, but it can challenge legacy tracing systems. When an item leaves its base hospital there is no longer any guarantee that its internal identification number is unique.

By assigning a universally unique identifier (barcode) to each instrument tray, each step in the process can be recorded. As trays move between hospitals, each receiving hospital scans the bar code. This enables the details to be imported from the hospital that owns the set and maintains the identification integrity of the individual tray and contents.

Where before there was a paper based, potentially error-prone and labour-intensive process, the HSE has implemented a national track and trace system for all instrument sets and endoscopes. The current implementation includes two thirds of the Central Decontamination Units (CDUs) in Ireland and full national implementation is expected by 2015.



"*Our collaboration with GS1 Ireland and the use of GS1 standards has helped us realise a world class electronic traceability solution for a number of HSE and HSE Funded Central Decontamination and Endoscopy Reprocessing Units*"

Pauline Biggane, HSE

Appendix 3 – Background to the National Product Catalogue

The National Product Catalogue (NPC) – Standardising Healthcare Product Data in Australia

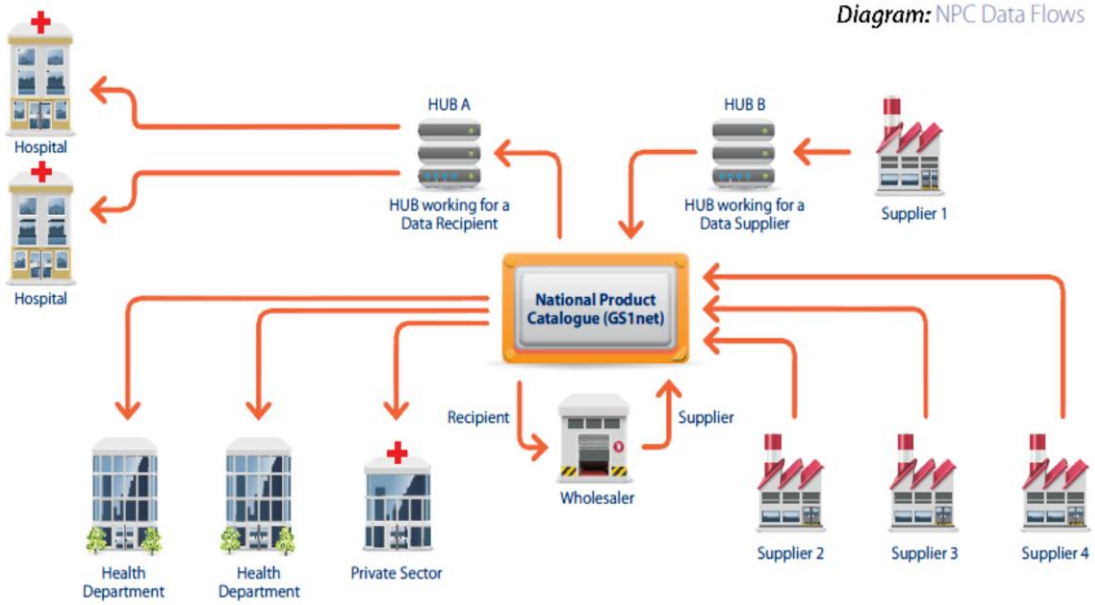
The National Product Catalogue (NPC) is a single repository of product, pricing and healthcare data for all healthcare industry product categories for the purpose of data synchronisation. These categories include pharmaceuticals, medical devices (such as orthopaedic prostheses, implantable devices, dental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

The National E-Health Transition Authority (NEHTA) has worked with GS1 Australia to encourage suppliers of healthcare products to use the GS1 Global Data Synchronisation Network (GDSN) compliant National Product Catalogue (NPC), to communicate product and price data to all government and private sector healthcare purchasers within Australia.

Background to NPC in Australia

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

Diagram: NPC Data Flows



The NPC provides a method for all suppliers from large multinational companies to Small-to Medium-Enterprises (SMEs) to publish their product and customer specific price data to their buyers. The large buyers in healthcare including State and Territory governments and private providers are progressively requiring more and more data from the NPC to maximise efficiencies throughout the healthcare supply chain. Increasingly, buyers are using the NPC as a starting point in their search for products due to the standardised data.

Key Advantages of the NPC and Data Synchronisation:

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

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