

DATA CRUNCH REPORT

Healthcare Data Crunch

Quantifying the benefits of
accurate data in an electronically
enabled supply chain



The Australian healthcare sector is a \$120 billion-plus growing industry¹, and with a rapidly growing population where 13.5% of residents are over 65², the country can ill afford inefficient healthcare supply chain practices. The healthcare supply chain itself is complex, involving various players, with the ultimate objective of delivering the right product to the right patient at the right time. Accurate healthcare supply chain data is essential to achieve this objective. It is also important to remember that the healthcare supply chain encompasses not only medicines, medical devices and medical consumables, but also food, hardware, office products as well as other product categories, all requiring accurate product data.

The Australian Healthcare Industry Data Crunch report was commissioned by industry under the auspices of the National E-Health Transition Authority (NEHTA) Supply Chain Reform Group (NEHTA SCRG) which helps drive the (NEHTA) Supply Chain Programme. This programme has been a foundational component of NEHTA's work. Members of the SCRG include representatives from public and private healthcare buyers, suppliers of medicines, medical devices and medical consumables, industry and healthcare associations, professional bodies, as well as global standards and supply chain resource providers, and national and state/territory health departments. The SCRG was put in place to govern the identification, development and implementation of solutions for all interested partners in the supply chain.

This report highlights the outcomes that can be gained from an in-depth study about data quality, using analysis of key business processes to identify potential benefits.

This is done by studying five scenarios within three business cases – procurement, external logistics and reimbursement of prostheses.

The report identifies the benefits to all parts of the supply chain by bringing healthcare product data quality up to best practice.

The aim of the Healthcare Industry Data Crunch report is to focus industry attention on the need for continual data quality improvement in healthcare.

The healthcare sector took an important first step towards supply chain data quality excellence when in 2006, NEHTA commissioned the National Product Catalogue (NPC). The NPC is hosted on GS1net, GS1 Australia's GDSN-compliant data pool, and is a central repository of accurate, standardised information about products ranging from large medical devices, to consumables and medicines. The objective of the NPC is to improve data quality, consistency and timeliness across Australian healthcare.

Less than a decade later, the NPC leads the world in best practice healthcare data synchronisation, and the quality and consistency of data exchanged between trading partners has improved significantly, but there is still work to be done. The NPC now contains more than 300,000 item records, and is being used by more than 400 healthcare industry suppliers and buyers. More than 90 of the top 100 Australian healthcare suppliers of medicines, medical devices and medical consumables to public healthcare jurisdictions are currently participating with the NPC.

¹ Refer: <http://www.aihw.gov.au/australias-health/2012/spending-on-health/>; Note all monetary values quoted in this report are AUD
² Refer: <http://www.abs.gov.au/ausstats/abs@.nsf/mf/3201.0>

The business case for the implementation of the NPC is very clear. This report studies three sets of data attributes where the adoption of the GS1 System of global standards via the NPC can improve data quality, leading to significant savings in the healthcare industry.

Using the NPC for data provision, a participating organisation which doubled the number of purchase orders received per month, was able to reallocate one FTE to other duties whilst maintaining current service levels. A different organisation quantified that >10% of manual orders have errors, whilst electronic orders using data synchronised through the NPC have an error rate of <1%.

Given the positive outcomes seen, steps to further improvements and efficiencies are proposed.



Potential savings from improved data quality³

By conservative estimates, more than \$100 million in potential savings can be achieved by addressing product data quality issues by making only minor adjustments to existing processes.

It is expected that upon seeing these potential benefits, industry will actively work to review their business processes, further utilise the NPC to improve data quality and ultimately take out unnecessary sector costs.

³This report provides high-level financial benefits and detailed calculations are available on request.





Contents

Executive Summary	2
Data Quality in the Healthcare Sector	5
The Participants	8
Business Processes Analysed	9
- Procurement	9
- External Logistics	11
- Reimbursement of Prostheses	12
Overall Business Implications	14
The Future	15

The importance of quality product data in the Australian healthcare supply chain has been well understood for many years. As a result, data synchronisation was a primary focus in the National E-Health Transition Authority's (NEHTA) Supply Chain Reform Program starting with the deployment of the National Product Catalogue (NPC) in 2006.

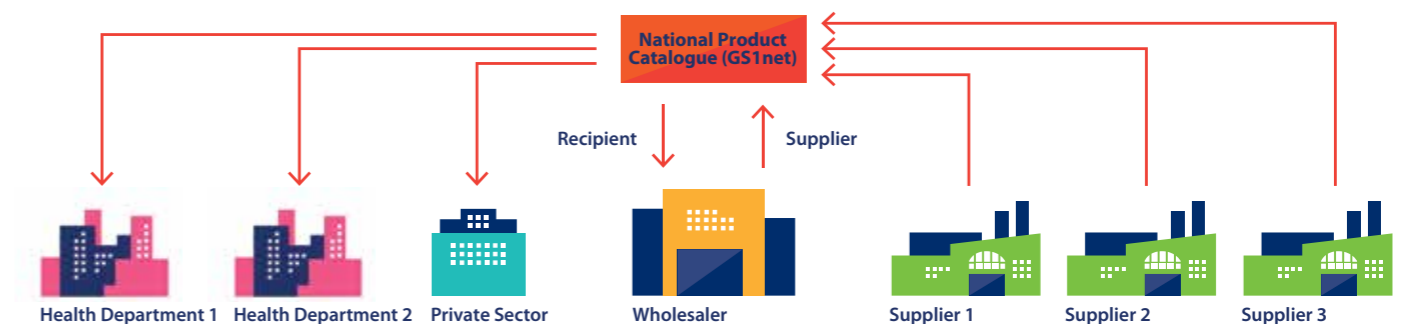
Hosted on GS1net, GS1 Australia's Global Data Synchronisation Network (GDSN) compliant platform, the NPC uses the GS1 Global Trade Item Number (GTIN) as the primary identifier for all products at all levels of packaging. The NPC now contains more than 300,000 records and is being used by more than 400 healthcare industry organisations operating in Australia, encompassing global and local suppliers, distributors, public and private sector hospital networks, and retail pharmacy chains.

Using the NPC, suppliers have the ability to provide standardised, consistent data in an automated way to trading partners across Australia including all healthcare jurisdictions, private sector networks, wholesalers and distributors, as detailed in **Diagram 1**.

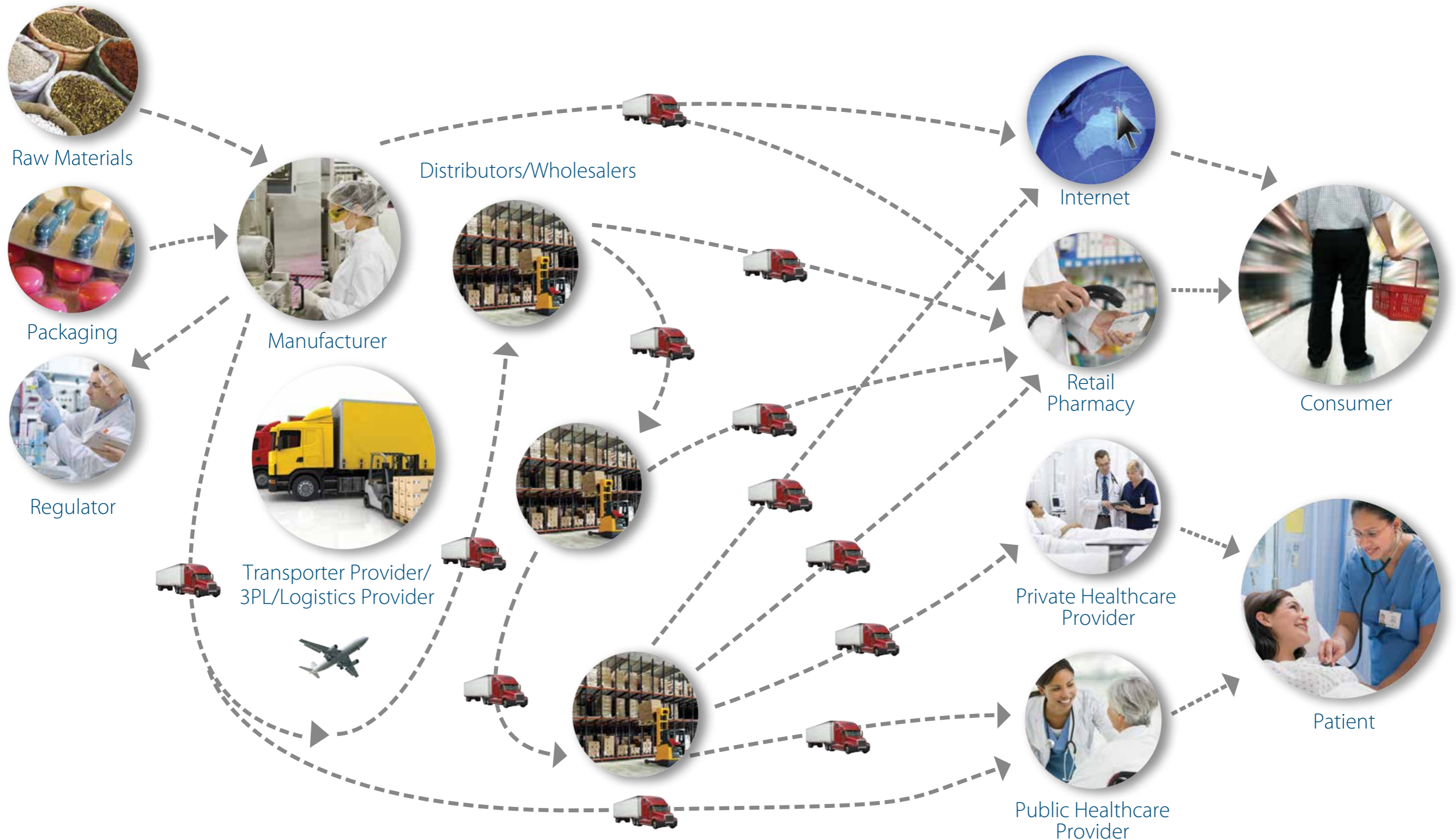
The Australian healthcare sector has led the way by adoption of the NPC, which continues to be the world's most wide-ranging and successful healthcare GDSN implementation. Given this foundation, we are now well placed as Australian healthcare organisations seek to innovate in other areas of the supply chain to achieve future efficiencies. This includes warehousing and distribution, electronic recall processes and electronic procurement messaging, all relying on accurate and complete product data delivered throughout the industry by the NPC.

Seven years after the deployment of the NPC, the healthcare sector has seen a slowly increasing consistency and accuracy of healthcare product data. As a result, the industry is well positioned for a step-change to drive data quality further. It is now time to progress from NPC roll-out to specific-use case analysis to drive further data quality improvements.

Diagram 1: NPC data flows



Complexity of Product Data Movement in the Healthcare Supply Chain: A Real Life-Representation



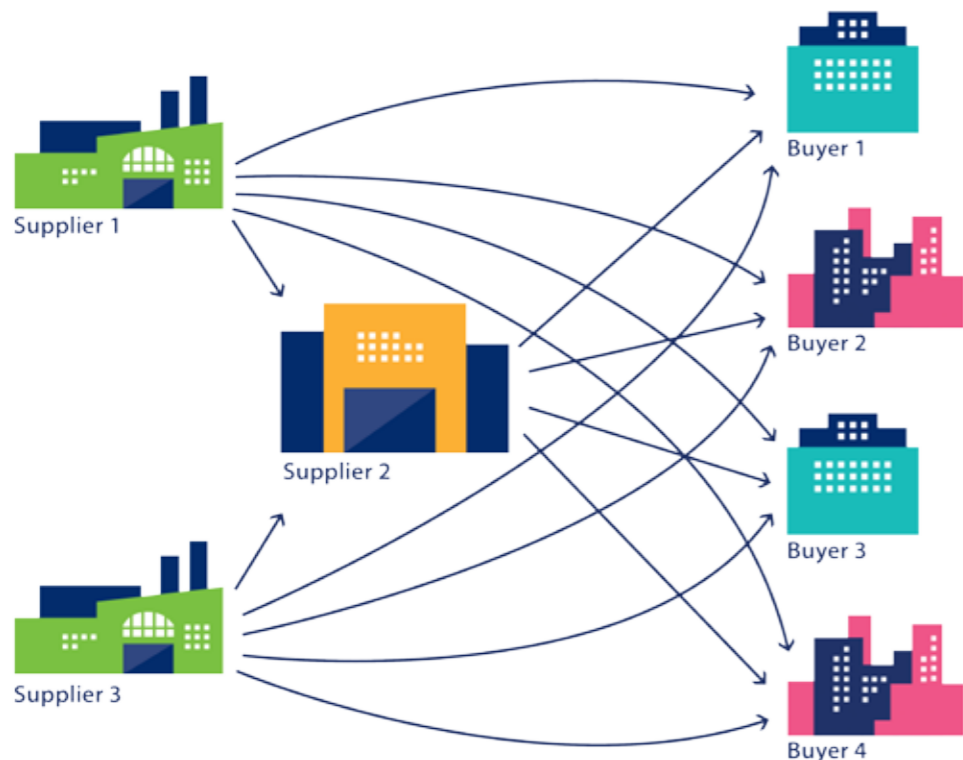
Four Australian state government jurisdictions (buyers/receivers of data) and three suppliers were involved in the study. These participants represent all functions within the healthcare supply chain – supplier, wholesaler, distributor and buyer – trading all product categories – pharmaceuticals, simple medical devices, complex medical devices and medical consumables. The supplier and jurisdiction sizes varied ensuring small, medium and large organisations were represented on both the supplier and buyer side of the trading relationship.

Role	Approx. number of orders / month	NPC status ⁴
Buyer	3,235	Integrated
Buyer	850	Integration project in progress
Buyer	900	Integration project in progress
Buyer	12,500	Integrated
Supplier	4,500	Data loaded
Supplier	47,000	Data loaded
Supplier	3,500	Data loaded

Table 1. Study participants

These organisations currently trade with each other to varying degrees, as detailed in **Diagram 2**. Each buyer represents up to 20% of their supplier's total sales volumes, ensuring the data crunch analysis and results have representative relevance.

Diagram 2: Data Crunch participant trading relationships



⁴Integrated means the supplier automatically pushes electronic messages containing changed data or new products to the NPC and the buyer receives automatic updates (via electronic messaging) of this changed or new data.

Procurement

The majority of procurement activity undertaken currently in the Australian healthcare sector, relies on identification of products using the vendor item code and unit of measure. The vendor item code is the supplier's internal reference number or internal product number allocated to identify a particular product.

Net content is the numerical value given to describe the amount of the product contained in a package as claimed on the label. Given the importance of these fields in the procurement process, these were valuable fields to study.

Vendor item code data was provided in all data files. Results showed a minimum match of 28.6% and maximum match of 100%. Net content and unit of measure data was provided in all files. Matching varied from 0% to 99.6% for the two fields.

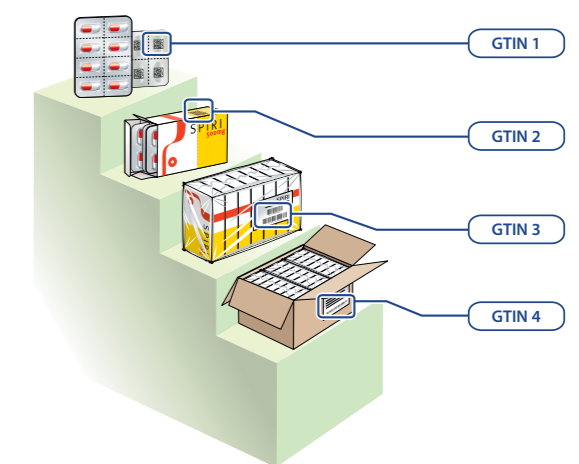
Anecdotal feedback indicates this is significant improvement on pre-NPC accuracy. However, the results show there is a risk that the wrong product at the wrong quantity could arrive at hospital stores area, resulting in both inaccurate supply and patient safety impact due to reduced quality of care. This finding reinforces participant comment about the variability of the data across the sector and the associated workaround processes that fail to address this problem.

Participants advised that when the vendor item code and unit of measure are used during manual procurement processes, associated data fields, such as price and description, are often double-checked, adding 33% additional time for validation. The buyers said that when they had a mismatch on a vendor item code or unit of measure they had to physically check the product packaging, thus adding another task to the process.

Participants identified inaccurate units of measure as one of the greatest issues of concern that increases processing cost in the healthcare supply chain.

In contrast, participants confirmed that when a GTIN is used to identify a trade item (product) at a specific level of content (i.e. a different and unique GTIN is allocated to each product at each level of packaging, refer to **Diagram 3**), double checking of the vendor item code and unit of measure is no longer needed. Currently 97% of all medicines traded in Australia carry their GTIN in GS1 bar codes, and 75% of medical devices carry GS1 GTINs in bar codes⁵. Through implementation of the NPC, the products not labelled with a GTIN in a GS1 bar code are allocated a GTIN ensuring unique identification of the product in the Australian healthcare sector.

Diagram 3: Example healthcare product hierarchy



All participants confirmed that the use of GTINs to identify products during electronic messaging means no manual intervention is necessary in the ordering process. This is particularly pertinent today as the Australian healthcare sector is quickly moving towards electronic procurement, relying on the NEHTA eProcurement Solution⁶.

Unique trade item identification, by use of the GS1 Global Trade Item Number (GTIN), removes inconsistency in product identification and is a foundational requirement to achieve effective procurement and product traceability for improved quality of care.

⁵Refer: <http://www.gs1au.org/assets/documents/industry/healthcare/GS1-Australia-Healthcare-Barcoding-Growth-Data-Analysis-Sept-2013.pdf>

⁶Refer: <http://www.nehta.gov.au/our-work/supply-chain>

As vendor item codes are allocated by each organisation that trades its product throughout the supply chain (e.g. supplier, wholesaler, distributor), duplicate codes are very likely to exist in IT systems, contributing to confusion and unnecessary manual intervention.

Varying vendor item code formats and special characters such as dots and dashes are found to be used frequently but are often not supported by healthcare IT systems nor used in supplier systems. This also means the vendor item codes provided sometimes do not match those marked on the packaging. For these reasons, study participants indicated that matching based on vendor item code is often difficult and inaccurate.

Many of the mismatches found in this study were due to the use of different vendor item codes by wholesalers, distributors and manufacturers. This means that clear identification of a product across all parts of the supply chain is not possible, resulting in errors across the entire procurement process.

Lack of trust in the accuracy of vendor item codes and units of measure inevitably leads to costly work-around activities. For example, a participant indicated that its suppliers' customer services teams normally receive their orders, review the total value of the order and the associated vendor item code, then divide the total by the number of items ordered to determine which unit of measure is being ordered.

Manual intervention to double check the quantities ordered has the potential to add \$8.8 million per annum to overall Australian healthcare supply chain costs.



Potential cost of manual checking of unit of measure

The end result of an incorrect unit of measure will be either undersupply or oversupply of goods. In the case of undersupply, the buyer receives a lower unit of measure than they thought they had ordered, which results in the hospital stores being unable to supply the wards, which can potentially affect patient care levels. It was reported that at least once a month there is a need to place an emergency delivery order due to undersupply. This incurs priority shipping costs at approximately \$1,000 for each shipment to a regional location.

At a conservative estimate, considering both regional and metropolitan hospitals, catering for urgent deliveries due to undersupply has the potential to add \$4.37 million per annum to Australian healthcare supply chain costs.



Potential cost of urgent deliveries due to undersupply

It is important to note that this \$4.37 million does not include the time and effort required of staff on both sides to address the initial error and arrange the urgent order. Nor does this take into account the impact of stock not being available at the time it is needed for patient care and the financial impact due to medical procedures unable to be undertaken.

More importantly, the impact on patient safety from stockouts should always be considered as a first priority.

In the case of oversupply, which is a more common occurrence than undersupply, the buyers will need to assess if they will use the full delivery within the expiry period, and if not, the goods will need to be returned. This adds extra labour, transport and processing costs to the supply chain.

It was identified that "returning over-supplied quantities of goods or incorrect items was the most expensive exercise" for businesses. The use of the globally unique GTINs to enable identification of products at specific levels of packaging helps mitigate this problem.

External Logistics

External logistics – shipping goods between trading partners – requires all parties to have accurate weights and dimensions for the products being shipped. These weights and dimensions can also be used for activities such as warehouse management, optimal shipment and transport packing, imprest layout planning and Occupational Health & Safety (OH&S) compliance.

In this study, two groups of product data attributes needed for external logistics were discussed. These were the gross weight of the product, which is the weight of the trade item including all packaging materials, and the dimensions of the product, the height, width and depth of the trade item⁷. Findings indicated that participants could not provide product gross weight and dimensions data. Some files contained data for selected fields, but no data matching was found in these cases.

The above results are of concern given that in parallel with the roll-out of the NPC, a number of healthcare buyers are implementing, or planning to implement, their own warehouses and associated warehouse management systems. To do this effectively, and ensure appropriate space is assigned as put-away locations for order picking/packing operations, accurate product weights and dimensions are required.

Conversely, suppliers are beginning to streamline their distribution and storage operations in many areas, including order consolidation to maximise truck space and minimise transport.

Product weights and dimensions are critical data elements for the effective operation of the healthcare supply chain. However, the study results indicate that this data is not effectively captured or shared by healthcare trading partners.

Participants advised that due to lack of accurate weights and dimensions, logistics units are packed "as best as possible", recognising that there is a lot of expensive "fresh air" (partially filled cartons) being shipped between healthcare trading partners, or between hospital warehouses and wards.

⁷ Refer: GDSN Package Measurement Rules, GS1 Standards Document Issue 1.11.1, Jun-2011.

Suppliers have the weights and dimensions data needed both internally, and externally by their trading partners, but generally this information is stored in design or artwork records, not in a format that can be easily exchanged. Thus suppliers have to 'find' this data within their own organisations so this can be used for both their own systems and their trading partners' supply chain initiatives.

Study participants expressed a desire for weights and dimensions to receive increased attention. Each part of the healthcare supply chain is currently measuring the same products to collect weights and dimensions data. One participant hired a weight and dimensions measuring device for one month to measure, at carton level, the top 1,000 products traded by their business. Not only did they incur significant equipment hire and staff time costs, the measurements cannot be taken as absolutely correct as measuring weights and dimensions is considered an 'expert' task.

Based on information provided by participants, the need for even 50 industry supply chain partners to independently source product weights and dimensions for the same items, adds \$6.98 million per annum to industry costs.



\$6.98
million pa

Potential cost associated with independently sourcing product weight and dimensions

This assumes that all participants collect weights and dimensions data in a central database, which is not the case in a large number of organisations, including some involved in this study. As a result, the overall labour costs across the sector would be much higher, and the logistics of moving items to measuring equipment is also complex and expensive.

If all suppliers provided accurate weights and dimensions data to the NPC once, this would remove the duplication of effort that is currently being experienced across the sector. Costs and inaccuracies would be reduced as suppliers would provide their trading partners with trusted weights and dimensions data.

Reimbursement of Prostheses

As specified by the *Private Health Insurance Act 2007*, mandatory benefits for prostheses included on the Prostheses List must be paid by private health insurers to hospitals using these items. The Prostheses List contains the benefits applicable, and lists more than 9,000 products⁸. All products on the Prostheses List are identified with a Prostheses Rebate or Billing Code (PRC), often assigned at the supplier product family level, rather than to individual products. Both public and private hospitals require a link between products (identified by their GTIN) and their PRC to ensure the correct benefits are claimed. An average jurisdictional database will contain between 17,000 and 20,000 prostheses products, some of which are on the Prostheses List, but all of which require unique identification.

Prostheses Rebate Code data was provided by three participants⁹. Results showed some positive matching (one file matching 41.5%), but overall results were considered inconclusive¹⁰. In light of this outcome, participants indicated that accurate communication of the link between the GTIN and the PRC between suppliers and buyers is a significant issue.

⁸ Refer: <http://www.health.gov.au/internet/main/publishing.nsf/Content/health-privatehealth-prostheseslist.htm>

⁹ It should be noted that this field only applies to a subset of products from some participants.

¹⁰ There is potential for incomplete data, as some products requiring a prostheses rebate code may not have had this included in the data files provided.

This is reinforced by recent communications from state and territory governments and private hospital networks about the need for provision of accurate PRCs via the NPC¹¹.

Linking the family of products to the correct PRC allocated to the physical product (that is clearly and uniquely identified) is a demanding task for both suppliers and buyers. Approximately half of the sponsor companies included on the Prostheses List participate with the NPC¹². This equates to more than 60,000 records with a PRC in the NPC, meaning a large number of product variants are associated with one PRC.

The work effort for each hospital or group of hospitals across Australia in keeping the product to PRC relationships up to date manually is not only onerous but prone to error, as demonstrated by existing poor data-matching levels. All of this is done manually via phone calls from hospitals to sponsor (supplier) organisations. Advice from one participant was that their hospitals spend up to one hour per week per hospital phoning suppliers to verify codes.

When extrapolated across the Australian healthcare sector, time to make phone calls to suppliers to clarify PRCs has the potential to add \$1.26 million to hospital resourcing costs. Sponsors (suppliers) will bear similar resourcing costs, so the financial impact would double.



\$1.26
million pa

Potential cost of manual PRC clarification by hospitals

The second step in the prostheses process is to make the rebate claim. To do this, accurate data must be loaded in the buyer's systems. If the prostheses rebate codes are not accurate, incorrect claims are made and these may be rejected. Advice from one buyer was that it takes 10 minutes per procedure to enter prostheses rebate claim data into systems (once all codes are confirmed).

One participant claimed that up to 20% of prostheses claims are being rejected due to inaccuracies. Currently, supplier companies provide on-site staff to verify claim information – which incurs an additional cost to both the supplier and the buyer.

The manual process of keeping the link between products and their assigned PRC up to date often means that rebatable items are not identified as such, leading to loss of revenue for the hospitals. A health services organisation had identified a \$1.22 million variance between claimable products purchased and used, and those products actually claimed in the 2011–2012 financial year. This equated to \$175,000 of lost revenue.

Across the total healthcare supply chain, lost revenue from unclaimed joint replacement prostheses, costs in the order of \$8.75 million per annum.



\$8.75
million pa

Potential lost revenue from unclaimed joint replacement prostheses

It is important to note that there are a large range of non-joint-related prostheses, including stents, pacemakers and defibrillators. Additional revenue savings would result should these product categories also be studied.

¹¹ Refer: <http://www.gs1au.org/assets/documents/industry/healthcare/PRC-Prostheses-Rebate-Code-in-NPC-National-Product-Catalogue-Nehta-GS1.pdf>

¹² Refer: <http://www.health.gov.au/internet/main/publishing.nsf/Content/prostheses-list-pdf.htm>

Throughout this document five scenarios based on the participants' information have highlighted the potential savings that could result from accurate exchange of certain healthcare product data attributes. These examples do not include every possible saving that may result from efficiency gains from improved master data across the areas studied (internal code and unit of measure, gross weight and dimensions, and prostheses rebate code).

The five scenarios quantified in this study identified a potential total saving of \$30 million per annum for the Australian healthcare supply chain.



Potential savings for 5 scenarios studied

The five scenarios quantified relate to specific areas within three business processes for which NPC data is designed – procurement, external logistics and reimbursement.

Another five areas of saving were also identified through the study but not quantified:

- Time and effort required of staff on both sides to address the initial error and arrange the urgent delivery
- Reverse logistics in the case of oversupply
- Rejection of prostheses claims due to inaccuracies, coupled with the cost of the supplier companies providing on-site staff to verify claim information
- Lost revenue from inaccurate linking of data to patient for non-joint related prostheses claims
- Stock being unavailable for patient care and associated costs of delayed or cancelled procedures

At a minimum, ten scenarios have been identified for NPC data, for three business processes. At a conservative estimate and if the scenarios were incorporated into this study, it would increase the potential benefit by 100% to \$60 million per annum.

The NPC data set is designed to increase efficiency across the nine business processes, including sourcing/tendering, contracts, order/invoice reconciliation, internal logistics, external logistics, procurement, reimbursement, patient use, and regulatory data.

The participants identified that, whilst not fully costed in this report, savings and efficiencies across the nine business processes from improved data, would be greater than \$100 million per annum at a conservative estimate.



Conservative potential savings from improved data quality for all business processes met by the NPC data set

It is hoped that given the magnitude of the potential benefits described in this study, industry will increasingly appreciate the value of data quality within the Australian healthcare sector and act accordingly to solve this common problem. The outcome will be improved efficiency and increased patient safety.

All participants in this project have communicated their vision for the future involving an electronically enabled healthcare supply chain.

“Prior to the NPC, the industry kept applying short-term fixes to try to resolve their product data accuracy. Each short-term fix adds hidden resource costs and complexity. The introduction of the NPC means that half-efforts and short-term fixes can’t be used anymore. This ensures that best practice is implemented – a significant and positive change for the sector.”

Furthermore, healthcare buyers in Australia will not introduce electronic messaging without first having data synchronisation processes in place. Other industry sectors have proven that this is the correct approach; it is also supported by supplier participants in the study.

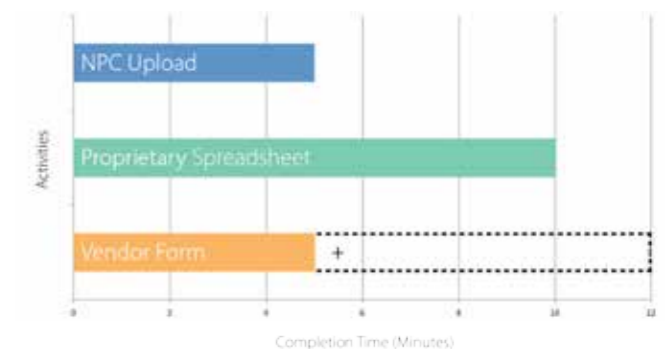
Suppliers are now putting in place company policies relating to data provision and encouraging all trading partners to use the NPC.

There has also been quantification of the time taken to advise trading partners of a single new product via various mechanisms, as detailed in **Chart 1**:

- Uploading the same data to the NPC – initially 5 minutes to complete (including data validation); this provides communication to all key trading partners at once avoiding re-creation of data for different trading partners

- Completing a proprietary spreadsheet – 10 minutes (per buyer)
- Communication via a vendor form – 5 minutes to complete + time to email by each vendor for each customer.

Chart 1: New product communication activities



The work involved in loading and maintaining the NPC, which provides accurate data to all public and key private sector buyers, is less than that for other methods of data communication.

The aim of the Healthcare Industry Data Crunch report is to focus industry attention on the need for continual data quality improvement in healthcare. The benefits of accurate data are confirmed via a number scenarios. Clearly, the costs of inactivity and accepting poor-quality data as the norm are unacceptable.

The participants in this project are keen to see all suppliers and buyers adopting the NPC, loading all product and price data accurately and consistently, and realising the resulting efficiency gains. Efficiency will only be achieved through the data synchronisation process itself, resulting in the use of consistent and accurate data across the supply chain.

The project participants call on all Australian healthcare companies to adopt the National Product Catalogue and work together to improve product data quality for supply chain efficiency and to improve patient safety.



GS1 is a registered trademark of GS1 AISBL

Head Office
Axxess Corporate Park
Unit 100/45 Gilby Rd
Mt Waverley VIC 3149
Locked Bag 2
Mt Waverley VIC 3149
T +61 3 9558 9559
F +61 3 9558 9551

Sydney Office
Lakes Business Park
Building 4B, 2-4 Lord St
Botany NSW 2019
Locked Bag 7002
Botany NSW 1455
T +61 2 9700 0933
F +61 2 9700 0820

1434_0214

National Number:
1300 BARCODE
(1300 227 263)

ABN: 67 005 529 920

www.gs1au.org