GS1 Healthcare US would like to thank the members of the GDSN Early Adoption Group for their participation in this important industry initiative, as well as the GS1 Healthcare US GDSN Implementation Workgroup for their contribution in developing this report.
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Executive Overview

In the fall of 2008, a group of U.S. healthcare stakeholders made the decision to begin using the GS1 Global Data Synchronization Network® (GDSN®) in a live production environment in order to advance the knowledge needed to support the successful adoption of the GDSN across U.S. healthcare. To support that effort, GS1 Healthcare US established the GDSN Early Adoption Group (EAG). The EAG included companies and organizations across all segments of the healthcare supply chain who have begun exchanging data using the GDSN in the real-world environment of their operations. The Early Adoption Group focused on accelerating the healthcare industry's adoption of the GDSN as the primary vehicle for sharing standardized healthcare product information in order to ensure that all supply chain partners are using identical, up-to-date, reliable product data. The goal of this document is to summarize the efforts and experiences of the Early Adoption Group in order to help others with their GDSN planning and implementation, and to present the EAG's recommendations to promote industry-wide adoption of the GDSN. Lessons learned and recommendations for initiating use of the GDSN, including a fuller understanding of implementation costs and expected returns, will continue to evolve as the healthcare industry gains experience with its use.

The GDSN Early Adoption Group

The GDSN Early Adoption Group included members from all major healthcare supply chain roles. EAG members participating in the live production environment adopting use of the GDSN included:

Healthcare Providers:
Premier Health Partners (PHP) - Dayton
Sisters of Mercy / ROi
University Community Health - Tampa

Group Purchasing Organizations (GPOs):
Amerinet
Novation LLC
Premier, Inc.

Manufacturers:
Baxter International Inc.
BD
Church & Dwight
Georgia Pacific
Kimberly-Clark Corporation
SAGE Products Inc.

Distributors:
Cardinal Health

Data Pools:
1SYNC™

Solution Providers:
DataPros for Healthcare

“The lessons learned by the early adopters prove that GDSN can function in healthcare and improve existing processes. To succeed with implementation, the healthcare community needs to embrace the agreed upon data attributes and begin using them in internal systems. Most importantly, the healthcare supply chain needs to begin transacting using GLNs and GTINs.”

Dennis Black
Director, eBusiness
BD
Background

The U.S. healthcare industry movement to improve patient safety and supply chain efficiency by using GS1 data standards is accelerating. Many organizations and companies throughout the U.S. healthcare supply chain have announced their support to adopt GS1 standards by the industry-accepted “sunrise” dates of December 31, 2010 for the Global Location Number (GLN) to standardize location identification and December 31, 2012 for the Global Trade Item Number® (GTIN®) to standardize product identification. The adoption and use of the GDSN is an important part of these initiatives.¹

There are over 30 million medical/surgical products on the market in the United States. Product information for one third of those products changes each year. Managing the information and these changes is a tremendous challenge in healthcare supply chains. For example, a single group purchasing organizations (GPO) is estimated to make as many as 30,000 changes per month.² The challenge is tremendous -- and so are the associated costs. Hospitals, GPOs and healthcare suppliers spend in excess of $5 million annually to align product information. Nonetheless, 30% of buyer systems are inaccurate and 60% of all invoices generated in the healthcare supply chain have errors. And despite all of the effort and the expense to align product information, the persistent invoice errors and erroneous transactions cost the healthcare industry $2 to $5 billion each year.³

In response, a number of healthcare manufacturers, distributors, GPOs and providers have participated in a pilot program sponsored by the United States Department of Defense (DoD) since 2006 to test the functionality and interoperability of the GDSN in the healthcare industry. In 2008, a subgroup from the DoD pilot program participated in the GS1 Healthcare Global GDSN Pilot which successfully demonstrated the global interoperability of the GDSN. Encouraged by these and other successes, the Early Adoption Group decided to advance the knowledge needed to support the successful adoption of the GDSN across U.S. healthcare by being among the first in U.S. healthcare to start using the GDSN in a live production environment.

GDSN Overview

The GDSN provides an efficient and effective approach to (1) storing GS1 product identifiers (i.e., GTINs) with their associated attributes, (2) checking to make sure that the identifiers and attributes are properly defined and formatted, and (3) sharing that information with supply chain partners. The GDSN offers a continuous, automated approach to data management that ensures that supply chain information is identical among supply chain partners, increasing data accuracy and driving costs out of the supply chain. In short, the GDSN is a means for sharing GTINs and their associated product information, and for updating that information efficiently, automatically and in real-time whenever there is a product change.

The GDSN is a network of interoperable GDSN-certified Data Pools connected by the GS1 Global Registry⁴. The Data Pools store and manage supply chain information for their users, and the GS1 Global Registry connects those Data Pools together. Companies and organizations access the network through any GDSN-certified Data Pool.

¹ Healthcare Industry Sunrise Dates: http://www.gs1us.org/hcsunrise
² GHX member (hospital, supplier and GPO) experience.
GDSN in Action

GDSN-certified Data Pools manage subscriptions for their users, and process the exchange of information using the GS1 Global Registry to obtain the necessary Data Pool information.

**Table 1: Operational Steps of the GDSN**

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1:</strong> Load Data</td>
<td>The supplier loads its GTINs and corresponding attribute information in a GDSN-certified Data Pool (known as <em>uploading</em> or <em>on-boarding data</em>).</td>
</tr>
<tr>
<td><strong>Step 2:</strong> Register Data</td>
<td>The supplier’s GDSN-certified Data Pool then registers the corresponding GTINs with the GS1 Global Registry (known as <em>registration</em>).</td>
</tr>
<tr>
<td><strong>Step 3:</strong> Create Subscription</td>
<td>To obtain product information, customers subscribe to the supplier’s GLN through the customer’s own GDSN-certified Data Pool. The customer’s Data Pool uses the GS1 Global Registry to identify the GDSN-certified Data Pool containing the requested information (i.e., the supplier’s Data Pool), and forwards the subscription request to that Data Pool.</td>
</tr>
<tr>
<td><strong>Step 4:</strong> Publish Data</td>
<td>The supplier “authorizes” its Data Pool to publish the information to that customer, and then the supplier’s Data Pool publishes the information to the customer’s Data Pool.</td>
</tr>
<tr>
<td><strong>Step 5:</strong> Confirm Receipt</td>
<td>The customer’s Data Pool then sends a confirmation directly to the supplier’s Data Pool. More than simply an acknowledgement, it informs the supplier of the action taken on the information by the data recipient.</td>
</tr>
</tbody>
</table>

Whenever information changes, GDSN users only need to make the changes in their GDSN-certified Data Pool. Once they send the updated information to their Data Pool, the Data Pool takes over -- validating the new information for compliance with GS1 standards and notifying the Data Pool of all supply chain partners who subscribe to the information about the update.

**Diagram 2: The GDSN in Action**

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This section is intended to introduce the GDSN at a high level. At this level, healthcare supply chain participants should simply think of the GDSN as the tool for ensuring that the information in their systems is accurate, properly formatted and up-to-date. Readers are encouraged to not get distracted by the details of how the GDSN works. Most of the operational processes are taken care of for you behind the scenes by your GDSN-certified Data Pool and the GS1 Global Registry.
GDSN Early Adoption Initiative

The Early Adoption Group believed that industry-wide adoption of the GDSN will be an iterative process. The group sought to build on the work of the DoD pilot and the GS1 Global Healthcare pilot, utilizing previously published reports from these groups as well as the GS1 Healthcare US Provider and Supplier Tool Kits as its starting point. Leveraging the existing work done to support GDSN adoption in healthcare allowed the group to begin to take the next step: develop lessons learned and best practices, and measure progress and benefits achieved. The availability of best practices, lessons learned and performance metrics are essential to adoption, but can only be developed when stakeholders implement in a live environment.

Links to all of the tools and materials used by the EAG and/or referenced in this document are provided in the Resources section of this document.

Hallmarks of the EAG Process

Adoption of the GDSN requires collaboration, and a collaborative process was used by the Early Adoption Group. In fact, the collaborative process used by the EAG was essential to its progress. It provided the methodology for EAG participants to fully engage in the GDSN Early Adoption initiative, and the path for arriving at where they are today. The EAG highlighted three key aspects of its collaborative process that they believed were vital to its success. Each is described below to help others with their GDSN planning and adoption.

❖ Executive sponsorship

The Early Adoption Group found that executive sponsorship was crucial. GDSN adoption requires the identification and commitment of appropriate resources, as well as the commitment to implement the appropriate next steps. Neither is possible without executive sponsorship from the outset. For their efforts, EAG participants found that executive sponsorship hinged on two efforts. First, they needed to ensure basic awareness of the GDSN at the executive level. Although many EAG participants found that their executives had at least some awareness of the GDSN, establishing and reinforcing a baseline understanding of the GDSN at the executive level was key. Second, Early Adoption Group participants needed to convince senior management to support their pioneering initiative. In order to do that, they reinforced that although the full benefit of the GDSN would not be realized until critical mass was achieved, someone had to start.

❖ On-site assessment process

Early Adoption Group participants underwent an on-site assessment conducted by 1SYNC (a GDSN-certified Data Pool) to facilitate proactive planning of a data synchronization program. The assessment included a detailed evaluation of product data related business processes, as well as identification of specific objectives and areas of return. The detailed assessment facilitated the development of a high level project plan that identified the key tasks for a successful data synchronization implementation. For example, the assessment included a detailed review of contract management, item management and information technology. The in-depth review covered business processes, data requirements and technical topics, including:

- Processes for new item/product introduction
- Processes for updating item information
- Current master data management system & processes
- Contract management processes
- Problems or impact of inaccurate item data
- Critical product attributes being used
- Data formats being used
- Internet messaging tools or AS2 certifications (if any)
- Communication and work with the supplier community
- Familiarity with GS1 Identifiers (GTIN, GLN)

❖ Consistent project reviews

GS1 Healthcare US moderated regular meetings with the implementation teams from participating EAG companies and organizations. These meetings kept members fully engaged in the process, and provided a forum for discussing issues and sharing insights and progress. The meetings were substantive and productive, often focused on essential implementation details like:

- Method and status of connectivity
- What data was published (for manufacturers) and what data was received (for providers, distributors and GPOs)
- How the data was populated
- What connections between EAG members were in place and which connections still needed to be established
Objectives of the Early Adoption Group

1: Establish an agreed-upon set of GDSN attributes for healthcare in the U.S.
2: Exchange data via the GDSN.
3: Develop a set of meaningful metrics to measure success of the GDSN as full implementation and integration with back-end systems progresses.
4: Articulate recommendations and insights to promote industry adoption of the GDSN and publish findings.

Adoption Highlights

The Early Adoption Group used a collaborative process to work together as they incorporated the GDSN into their real-world operations environment. Their efforts included the following milestones:

- Manufacturers loaded product information into their selected GDSN-certified Data Pool using an agreed upon set of attributes for healthcare. That set was comprised of forty (40) attributes including those attributes that are mandatory for passing product data through the GDSN regardless of industry, as well as additional attributes considered crucial by healthcare data subscribers.*
  
  * The official list of standardized GTIN attributes for healthcare was approved by GS1 Healthcare in March 2009. A list of those attributes is provided in Appendix A of this document.

- 1SYNC provided the on-board product management and support for the participants, including on-boarding solution provider partner support as required.

- Data recipients subscribed to manufacturer information via their selected GDSN-certified Data Pool.

- Manufacturers published their product information to subscribers of their company’s product data.

- Subscribers reviewed data published by manufacturers and sent acknowledgements per the established messaging protocol for the GDSN (“synchronize”, “accept”, “reject” or “review”).

Critical Success Factors

- Executive sponsorship
- Collaborative process
- Formal, scheduled group meetings
- Strong IT
- Data maintenance experts
- Strong, cross-functional group that communicates and works well together
**Key Performance Indicators (KPIs)**

The Early Adoption Group felt strongly that the development of key performance indicators (KPIs) to measure the GDSN’s effectiveness in operation was essential to promote adoption throughout U.S. healthcare. To that end, EAG participants developed a specific list of KPIs that they will be measuring in their organizations. These KPIs will be tracked by the individual participants going forward in order to provide statistics regarding adoption success to support new healthcare supply chain partners developing GDSN adoption plans. KPIs identified by the Early Adoption Group for data sources (i.e., manufacturers) and data recipients (i.e., providers, GPOs and distributors) included the following:

<table>
<thead>
<tr>
<th><strong>Data Source KPIs</strong></th>
<th><strong>Data Recipient KPIs</strong></th>
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<tbody>
<tr>
<td><strong>(Manufacturers)</strong></td>
<td><strong>(Providers, GPOs, Distributors)</strong></td>
</tr>
<tr>
<td>- Reduction in time required to process orders (indicator of the benefit derived from customers always using correct product code, unit of measure, etc.)</td>
<td>- Reduction in the number of man-hours required to add or update item information, particularly if done in an automated fashion</td>
</tr>
<tr>
<td>- Reduction in the number of rejected orders (indicator of the benefit derived from customers always placing orders with correct item information)</td>
<td>- Reduction in the time and number of manual “touches” from the point data is received until the product master is updated</td>
</tr>
<tr>
<td>- Reduction in the time required to correct rejected orders (e.g., reduction in the time a manufacturer’s customer service group spends calling customers to correct product catalog number, quantity, price, etc.)</td>
<td>- Increased efficiency in processing of rebates</td>
</tr>
<tr>
<td>- Reduction in transportation costs due to inaccurate shipping weights or package dimensions</td>
<td>- Increase in the number of products with UNSPSC codes identified</td>
</tr>
<tr>
<td>- Increased revenue resulting from customers having visibility to all product codes</td>
<td>- Improvement in the quality of product descriptions compared to those previously received (e.g., consistency with upper or mixed case; consistent abbreviations; etc.)</td>
</tr>
<tr>
<td>- Increased revenue from customers having visibility to new items more quickly</td>
<td>- Reduction in invoice issues related to wrong or obsolete codes being ordered (e.g. aging receivables, number of write-offs, credits issued, etc.)</td>
</tr>
<tr>
<td>- Reduction in the time spent to introduce new items</td>
<td></td>
</tr>
<tr>
<td>- Reduction in the number of inquiries to sales representatives and customer support centers involving product information, including weights and dimensions.</td>
<td></td>
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</table>

“We often receive incorrect or incomplete product information from unreliable sources. Human error is another source of inaccuracy. Problems like these affect our operations in a multitude of ways, ranging from invoice discrepancies and delivery delays to shipments of incorrect product. With the GDSN, we found a system capable of eliminating these errors by ensuring that supplier data attributes, direct from the source, are synchronized with ours.”

Alex Zimmerman
Director, Supply Chain Info. Mgmt.
ROI, Sisters of Mercy Health System
Recommendations for a Phased Approach to Adoption

The Early Adoption Group utilized the GS1 Healthcare US Provider and Supplier Tool Kits to guide its adoption efforts. With the industry-accepted "sunrise" dates of December 31, 2010 for the GLN and December 31, 2012 for the GTIN approaching, the EAG sought to articulate recommendations for a phased approach to GDSN adoption to coincide with those sunrise dates. The Early Adoption Group defined six phases of adoption with specific activities to be achieved in each phase, as shown in Diagram 3. Following the diagram, the EAG provides specific insights for many of the actions in the six phases to adoption.

Adoption of GDSN in Healthcare by 2012

Assumes an organization has completed Phase Two of the GTIN Implementation Plan and that manufacturers have assigned GTINs to their products.

Diagram 3: Phased Approach to Adoption Recommended by the Early Adoption Group

“The industry will significantly benefit from being able to pull product identifiers (GTIN) and basic product attributes from one location, namely the GDSN. This single source will help prevent duplicate identifiers and outdated product information from flowing into the healthcare supply chain. In addition, the GDSN will facilitate more efficient order-to-cash transactions and barcode scanning. This use of the GDSN and GS1 data standards will help drive savings by reducing data rework and errors in the supply chain.”

Lalit Thakur
Director, Master Data Management
Premier, Inc.
Phase One: **Commit**

**Manufacturers / GPOs / Distributors / Providers**

- **Create awareness of the GDSN and its benefits, and obtain executive sponsorship to move forward with implementation.**

  All functional areas and departments within an organization as well as senior management have received education on GS1 standards and understand how the GLN and GTIN are used in the healthcare supply chain.
  
  Organization has an executive sponsor who will champion the initiative and drive cross departmental commitment on resources necessary for implementation.

---

Phase Two: **Assess**

**Manufacturers**

- **Perform a gap analysis of GTIN attributes to determine what work flow changes are required to comply with GS1 standards and the GDSN.**

  Review the list of 40 GDSN healthcare attributes and prepare a spreadsheet that maps GDSN healthcare attributes to the attributes currently in your master product data file(s).

  Identify gaps (i.e., attribute information for your products required for using GDSN in healthcare which is not available today). This exercise will help provide clarity on all of the attribute information you will be publishing.

  Confirm your company’s current data management and distribution model. Consider how and with whom you currently share data as well as the supply chain partners with whom you will be sharing this information in the future using the GDSN. Determine whether you will keep the current data management model or establish a new one including new procedures, roles and responsibilities.

  Ensure that your company has processes and procedures to assess data quality and procedures to correct the root cause of problems. Do you have a procedure of informing your customers when changes to products are made?

- **Assess systems’ ability to store, publish & maintain GDSN attributes.**

  Understand where all of the product attribute data may be located and whether it is possible to modify internal systems to accommodate and maintain all of the appropriate GDSN attributes.

---

4 Six of the forty healthcare attributes are pending final development and incorporation into the GDSN standard. These “pending” attributes are clearly identified in Appendix A, as well as in the GTIN Attributes for Healthcare Products – Interactive Spreadsheet referenced in the Resource section of this document.
Phase Two: Assess (continued)

GPOs / Distributors / Providers

- Perform an analysis to identify gaps between currently stored product attributes and GDSN healthcare attributes.
  
  Review the list of 40 GDSN healthcare attributes, determine which are applicable to your organization’s needs and prepare a spreadsheet mapping GDSN healthcare attributes to the attributes already in your item master. Identify gaps (attribute information you currently do not store, but which you expect to be provided to you via the GDSN). This exercise will help provide clarity on all of the attribute information you will be receiving.

  Confirm your organization’s current data management and maintenance model. Consider how and from where your data is currently coming and how it will be affected by receiving files that will include standardized data. Determine if you will keep your current data management model, establish a new one, or will require a hybrid approach to manage the transition to include both standard and non-standard data feeds as the industry progresses. New models may include new procedures, roles and/or responsibilities.

- Assess system’s ability to receive, store, manage, use and maintain GDSN attributes.
  
  Understand where all of the product attribute data may be located and whether it is possible to modify internal systems to accommodate and maintain all of the appropriate GDSN attributes.

- Understand capability to integrate GDSN data with current information systems.
  
  Review current data flow processes to see where product information flows following receipt from the GDSN into the MMIS, PIMS or ERP. Next, understand what system changes will be required to feed data obtained through the GDSN to other information systems within your organization and keep this information updated.

Phase Three: Select

Manufacturers / GPOs / Distributors / Providers

- Evaluate GDSN-certified Data Pools for the best fit with your organization’s business objectives, and then select and subscribe to a GDSN-certified Data Pool. Selection criteria to consider:

  - **Track Record**
    - Number of successful implementations
    - Performance statistics (available on the GS1 website)
  
  - **Ability to Educate on GS1 Standards**
    - Explanation of GLN, GTIN and other GS1 identifiers, as well as the GDSN
    - How the different standards work together
  
  - **Industry Experience**
    - Healthcare
    - Other industries
  
  - **Subscription Options**
    - Single year
    - Multiple year
  
  - **Subscription Fees**
    - Revenue or usage based?
    - Any additional fees for implementation services including initial set-up
  
  - **Options**
    - Graphic user interface (GUI)
    - Hosted solution (Data Pool-supplied GUI/spreadsheet tool)
    - Machine-to-machine (AS2)
    - 3rd party applications [e.g. offered by solution providers other than your Data Pool, File Transfer Protocol (FTP)]
    - Behind the firewall (proprietary software)
  
  - **Customer Support**
    - Ability to demo options for connecting to the GDSN
    - Implementation support for initial set-up, including ability to assess and analyze internal data flow processes and data requirements
    - Implementation support for initial set-up
    - Ongoing customer support offered
    - Hours of support
  
  - **Relationship with Solution Providers**
    - Does the Data Pool have relationships with solution providers/software vendors to assist with implementation?
**Phase Four: Implement**

**Manufacturers**

- **Prepare data by updating internal system(s) to close gaps identified in your gap analysis and perform data quality/data cleansing activities**
  
  Create/generate attribute information required by the GDSN which is not already available in the company’s product data master. This healthcare industry-requested information may entail manual effort to specify the appropriate packaging level, weights, dimensions, etc.
  
  Ensure that all data is GDSN-compliant and can be sourced from the company’s ERP/product data master.
  
  Ensure the accuracy of product dimensions and measurements.
  
  Ensure compliance with GS1 Healthcare GTIN Allocation Rules.
  
  Understand the GS1 System.
  
  Verify bar code integrity, readability, correctness and authenticity.
  
  Ensure you have a data quality procedure in place to measure and correct data errors. Refer to the *GS1 Data Quality Framework* on the GS1 website for more information.

- **Connect to the GDSN and load data.**
  
  Review the various options (e.g., machine-to-machine/AS2; hosted solution/GUI; 3rd party solution; etc.) for loading and publishing product data made available through the company’s selected GDSN-certified Data Pool. Select the option that makes the most sense for your company. Load your data into the Data Pool.

- **Coordinate with customers. Confirm the attributes to be published with data recipients. Test with customers and review test results.**
  
  Communicate with data recipients to ensure that expectations regarding population and publication of product attributes are aligned.
  
  Publish data on a small subset of products to select customers to ensure that the exchange of data using the chosen method for connecting to the network is operating smoothly and that expectations regarding population of attributes and messaging between supply chain partners are aligned.

- **Educate and train staff about your Data Pool and the GDSN.**
  
  Ensure internal staff has an understanding of the GDSN and that internal data will now be transmitted externally.
  
  Ensure that all personnel responsible for loading product data in the selected Data Pool and authorizing publication have been appropriately trained on the GDSN standards, the Data Pool’s specific load and publish tools, and the CIC messaging protocol for communicating with data recipients (i.e., message from data recipient will be “accept”, “review”, reject” or “synchronize”).

- **Develop a maintenance plan and data governance procedures.**
  
  Develop a data maintenance plan to capture, store and share GLNs, GTINs and product attributes.
  
  Develop a plan for direct use of GLNs and GTINs within your master data management / ERP system (and connected systems). This plan may include the eventual elimination of a myriad of cross reference tables linking current internal product catalog numbers and customer numbers to GTINs and GLNs.
  
  Establish clearly defined processes to ensure that product information entered into or changed in the company’s product data master is accurate, up-to-date and compliant with GS1 standards. Clear roles, responsibilities and ownership for the different processes involved must also be established.

- **Begin synchronizing data.**
  
  Through your Data Pool, publish data on products as subscription requests are received.
  
  Continue publishing data and respond to CIC messages from data recipient as required.
Phase Four: **Implement (continued)**

**GPOs / Distributors / Providers**

- **Prepare data by updating internal system(s) to close gaps identified in your gap analysis and perform data quality/data cleansing activities**
  
  Ensure that the data fields necessary to store and use the applicable 40 GDSN healthcare product attributes have been built into your MMIS, PIMS or ERP. Work with your information system provider as necessary to accomplish this.
  
  Understand the GS1 system, including use of the GDSN.
  
  Verify bar code integrity, readability, correctness and authenticity.

- **Connect to the GDSN.**
  
  Review the various options for subscribing to and receiving product data made available through the organization’s selected GDSN-certified Data Pool. Select the option that best serves the organization’s needs.

- **Coordinate with suppliers. Notify supply chain partners. Confirm attributes. Test with suppliers and review test results.**
  
  Inform supply chain partners of your intention to begin receiving data via the GDSN from suppliers and clearly communicate your expectations.
  
  Clearly communicate with suppliers about your organization’s expectations regarding population and publication of product attributes. **THIS IS CRUCIAL TO SUCCESSFUL IMPLEMENTATION AND USE OF THE GDSN.**
  
  Ask a small subset of suppliers to publish product data to your organization to ensure that the receipt/exchange of data using the chosen method for connecting to the network is operating smoothly and that expectations regarding population of attributes and messaging between your organization and the suppliers are aligned.

- **Educate and train staff about your Data Pool and the GDSN.**
  
  Ensure internal staff has an understanding of the GDSN. The degree of knowledge increases the person’s sense of responsibility for product master data management.
  
  Ensure that all personnel responsible for sending product information subscription requests to suppliers and reviewing data received through the GDSN have been appropriately trained on the Data Pool’s specific tool for accessing the data received through the GDSN as well as the CIC messaging protocol (“accept”, “review”, “reject” or “synchronize”) for communicating with data publishers.

- **Develop data governance procedures and a conceptual data integration plan.**
  
  Establish clearly defined processes to ensure that product information entered into or changed in the company’s product data master is accurate, up-to-date and compliant with GS1 standards. Clear roles, responsibilities and ownership for the different processes involved must also be established.
  
  Determine who the responsible data source is if purchasing products from a distributor or reseller.
  
  Outline the organization’s plan for how the data received through the GDSN will be used to feed other information systems and maintain the integrity of the data in those systems.

- **Place subscription requests and on-board suppliers. Begin synchronizing data.**
  
  Using the selected GDSN connection method, subscribe to product data from all suppliers whose data you wish to receive. Establish contact with the individual(s) responsible for data synchronization and publishing at each supplier. Develop a plan for on-boarding all of the suppliers with whom you wish to begin synchronizing product data.
  
  Begin receiving data, making sure to acknowledge data messages received as appropriate using one of the 4 established CIC message responses (i.e., “accept”, “review”, “reject” or “synchronize”). This is a critical step as it informs the data source of the action you have taken with the data he is supplying and alerts him to potential issues that may need to be resolved before that supplier loads additional data into the GDSN.

* The steps in this phase are meant for organizations connecting directly to the GDSN. In the future, if other models for obtaining GDSN-sourced data emerge (e.g., a hospital obtaining GDSN-sourced data through its GPO), different steps would apply.
Phase Five: Transact

Integrating data into current systems used within a hospital allow for the greatest Return on Investment (ROI) for both the data source and the data recipient. Automating how the data is collected, stored, and communicated at the data source further increases the ROI for the data source and data quality for the data recipient.

Manufacturers

- **Begin transacting using data published through the GDSN.**
  
  Using information published through the GDSN, begin or continue transacting using GS1 product identifiers.

- **Reassess business processes & refine to meet organization’s goals.**
  
  Review, at regular intervals, the business processes that utilize information published through the GDSN and refine to best address the organization’s financial and operational objectives.

GPOs / Distributors

- **Develop tactical data integration plan.**
  
  Develop detailed plan for how to use the product data received via the GDSN to feed other information systems within your organization.

- **Execute plan.**
  
  Put tactical data integration plan in motion.

- **Reassess business processes & refine to meet organization’s goals.**
  
  Review, at regular intervals, the business processes that utilize information published through the GDSN and refine to best address the organization’s financial and operational objectives.

Providers

- **Develop tactical data integration plan.**
  
  Develop detailed plan for how to use the product data received via the GDSN to feed other information systems within your organization.

- **Execute plan.**
  
  Put tactical data integration plan in motion.

- **Begin transacting using GDSN data.**
  
  Using information received through the GDSN, begin or continue transacting using GS1 product identifiers.

- **Reassess business processes & refine to meet organization’s goals.**
  
  Review, at regular intervals, the business processes that utilize information published through the GDSN and refine to best address the organization’s financial and operational objectives.
Phase Six: Maintain

**Manufacturers**

- **Manage new product introductions and product updates with supply chain partners.**
  
  Publish information on new, changed or discontinued products to supply chain partners as appropriate.

- **Follow established governance plan for controlling data accuracy.**
  
  Ensure that all personnel with a role in the organization’s data governance processes adhere to established procedures. Review the organization’s data governance policy at regular intervals to ensure it adequately addresses the organization’s business needs.

- **Measure and monitor EDI effectiveness (i.e., change in number of exceptions (e.g., wrong/incorrect invoices, wrong unit of measure, etc.)).**

  As many manufacturers transact with supply chain partners using electronic data interface (EDI), EDI transactions should be monitored to ensure that use of GDSN continues to reduce the level of EDI errors.

- **Measure and monitor return on investment.**

  Assess the ongoing cost of using the GDSN and benefits accruing to the organization to maintain internal awareness of GDSN and help ensure continued executive support.

**GPOs / Distributors / Providers**

- **Update product item master.**

  Continue to update the organization’s item master with information received from manufacturers through the GDSN. Many organizations use a “staging” database where new information is reviewed prior to uploading to the item master.

- **Evaluate new attributes as necessary.**

  Periodically review the product attribute fields in the organization’s item master to determine if these attributes are adequate for all of the systems which rely on data from the item master. If it is determined that additional attributes information may be required, communicate this to the appropriate manufacturer or supplier.

- **Follow established governance plan for controlling data accuracy.**

  Ensure that all personnel with a role in the organization’s data governance processes adhere to established procedures. Review the organization’s data governance policy at regular intervals to ensure it adequately addresses the organization’s business needs.

“Accurate and globally synchronized product data is the key to enabling an efficient healthcare supply chain. By adopting the GDSN, healthcare providers, suppliers, GPO’s and distributors can spend less time on managing exceptions and more time on ensuring the safety of patients. Baxter's vision is to use the GDSN on a global basis as we see many potential benefits from industry-wide adoption such as reduced order rejections, improved cash flow, and potential increased revenues due to improved new product introduction processes.”

Barbara L. Zenner
Sr. Project Manager, eCommerce
Global Supply Chain Strategic Initiatives
Baxter Healthcare Corporation
Lessons Learned

Knowledge Base

Manufacturer Provider GPO Distributor
✓ ✓ It is important to educate all applicable internal staff about your organization’s move to begin using the GDSN. For some manufacturers, this may be the first time that data managed internally in their ERP will be shared “as is” directly to customers. This will ensure that personnel in the affected departments within the organization can communicate intelligently with supply chain partners who ask about the organization’s use of the GDSN and GS1 standards generally.
✓ Suppliers that already use the GDSN to synchronize data with retailers should know that healthcare customers will expect different attributes published than those you currently publish to retailers.

Product Information & Attributes

Manufacturer Provider GPO Distributor
✓ ✓ Make sure product attributes have been updated and are accurate before loading into the Data Pool.
✓ ✓ If your company’s product information is in multiple locations, consolidate the information into a single database (if possible), perform a gap analysis to see what GDSN-required attributes are missing, and fill in the missing information as appropriate. Pulling product data from a single internal system will make loading data into your Data Pool and publishing to demand side recipients much easier. Regardless of system(s) used, however, it is in the best interest of the manufacturer to simplify the process for extracting the data that will be loaded into the Data Pool.
✓ ✓ Set clear expectations up-front about which attributes need to be published and how they need to be populated. For example, if a data recipient needs to receive the manufacturer’s part number in the field designated for an additional product ID, then this expectation should be clearly communicated. The same is true for any of the forty GDSN attributes for healthcare where clarification may be required (e.g., functional name, description, etc.). Use of the GDSN healthcare attribute spreadsheet can be an important tool in promoting this mutual understanding between supply chain partners.
✓ ✓ GDSN attributes for healthcare should be accurately mapped to internal systems during the test phase to ensure a smooth transition to the production phase.
✓ ✓ Manufacturers should load and publish information on as many items in their product catalog as possible. Manufacturers and their supply chain partners (GPOs, distributors and providers) should continually manage their relationship to ensure all relevant items are being synchronized.

Systems and IT

Manufacturer Provider GPO Distributor
✓ ✓ While many electronic methods for exchanging information with your Data Pool are acceptable, maximum efficiency will be achieved through the use of Extensible Markup Language (XML).
✓ ✓ Supply chain partners should diligently follow a clear messaging protocol using catalog item confirmations (CICs) to ensure the smooth flow of item information and to alert supply chain partners of changes in item information in a timely manner.
✓ No new product should be added to the enterprise resource planning (ERP) system without the mandatory healthcare attributes populated.
✓ ✓ It is important to establish a process for updating your internal product data/item master with the appropriate attribute information as products are changed, added or discontinued. Suppliers should have a data alignment and data governance strategy that provides 1) a method for obtaining “clean” data, and 2) a way to keep it clean.
✓ ✓ It is critical that solution providers understand “inside and out” what information is to be stored.
## Operations

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Provider</th>
<th>GPO</th>
<th>Distributor</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Organizations should assess the time and resources needed, and budget appropriately for both.

✓  ✓  Executive support is critical to successful implementation. Adequate investment is necessary for successful adoption. Therefore, organizations need buy-in from senior management to ensure that GS1 standards-related projects receive proper priority, and that proper staff and resources are in place to meet the industry Sunrise dates.

✓  ✓  A single, dedicated individual should be established within each organization to oversee standards adoption and development strategies. The interconnected nature of GS1 standards means that a singular subject matter expert / process owner can provide a more cohesive overall strategy. This model has proven successful for early adopter organizations in many industries.

✓  Be sure to assign business ownership of the GDSN healthcare attributes, and that everyone understands that these attributes are required.

✓  Attribute information received through the GDSN should be fed to other information systems as appropriate.

## Collaboration

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Provider</th>
<th>GPO</th>
<th>Distributor</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Supply chain partners need to clearly communicate to each other the correct GLN to which the parties should subscribe and publish. This basic, but crucial step is essential for successful use of the GDSN and, if not completed, can delay implementation. Suppliers and providers often have multiple divisions or departments, and trying to guess the specific GLN that should be used can quickly become a frustrating and time-wasting endeavor. A manufacturer’s publishing GLN may be different from where orders are sent. Likewise, the GLN to which data is to be published might differ from a customer’s “bill to” or “ship to” GLN. Any possible confusion can be simply and quickly eliminated if the data publisher and data recipient simply exchange respective GLNs to be used.

✓  Establishing good communication with your suppliers and the key personnel within each supplier organization responsible for data synchronization is essential to effective implementation.

✓  When speaking to customers to whom you will be publishing data, it is important to let them know that they too will need to take the appropriate steps to bring their systems up-to-date if they want to receive maximum benefit from receiving product data through the GDSN.

✓  Successful community enablement (i.e., on-boarding and synchronizing with all of the suppliers whose data you wish to receive) requires good cooperation between the Data Pool and data recipient in communicating with suppliers.

✓  ✓  Continue to reinforce knowledge of GS1 standards by joining GS1 Healthcare US and taking advantage of the various educational offerings provided by GS1 US, and also by connecting with organizations that have programs to support the GS1 standards such as industry associations, GPOs and Data Pools.
Benefits & Next Steps

Benefits of the GDSN Anticipated by EAG Members

<table>
<thead>
<tr>
<th>Manufacturers</th>
<th>GPOs</th>
<th>Distributors</th>
<th>Providers</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ Improved data quality for both internal and external processes.</td>
<td>▪ Standardized format for product data received from manufacturers.</td>
<td>▪ Faster and more accurate new item add and product data maintenance processes.</td>
<td>▪ Reduced time and manual effort to add and maintain products in the item master.</td>
</tr>
<tr>
<td>▪ Faster loading of new items into customer ordering systems.</td>
<td>▪ Streamlined process for obtaining product data.</td>
<td>▪ Faster and more accurate maintenance of customer contracts.</td>
<td>▪ Reliable, accurate and up-to-date product information.</td>
</tr>
<tr>
<td>▪ Elimination of manual touch points for item set-up and maintenance.</td>
<td>▪ Improved rebate processing.</td>
<td>▪ Fewer customer inquiries on new or existing products.</td>
<td>▪ Elimination of unit of measure errors.</td>
</tr>
<tr>
<td>▪ Faster and more accurate maintenance of customer contracts.</td>
<td></td>
<td>▪ Streamlined processing of rebates.</td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Benefits of the GDSN

Next Steps

- Integrate data shared via the GDSN into the organization’s business model, and use it to feed other information systems throughout the organization.
- Conduct business transactions using data shared via the GDSN.
- Track key performance indicators in order to quantify the efficiencies and benefits achieved.
- Work to ensure GDSN product information supports all healthcare product categories including pharmaceuticals.
- Continue to define lessons learned, best practices and measurements of success, and develop cost/benefit models to promote broad industry adoption of the GDSN.
- Demand side/customers communicate adoption plan to suppliers. Suppliers communicate GDSN capability to industry stakeholders.

“Implementation of the GDSN will provide several benefits to the manufacturing community and overall supply chain. Utilization of GTINs for transactions will virtually eliminate unit of measure ordering errors and will facilitate product withdrawals from the market. Providing consistent, real time, updated, product attribute information through the GDSN will reduce confusion and significantly reduce the sheer number of individual phone and e-mail requests for this information. These are great steps in the right direction.”

Roy Ludvigsen
Associate Director, Supply Chain
Kimberly-Clark Corporation
Resource Links

- GS1 Healthcare US Website: http://www.gs1us.org/healthcare
- GS1 Healthcare US Document Library:
  http://www.gs1us.org/hclibrary
- GDSN Healthcare Provider Tool Kit: http://www.gs1us.org/hcptoolkit
- GDSN Healthcare Supplier Tool Kit: http://www.gs1us.org/hcsuptoolkit
- 2010 GLN Sunrise / 2012 GTIN Sunrise Dates:
  http://www.gs1us.org/hcsunrise
- GDSN Implementation Guides are available in the GS1 Standards Knowledge Center:
  http://www.gs1.org/services/gsmp/kc/gdsn/index.html
- GTIN Attributes for Healthcare Products – Interactive Spreadsheet:
- List of GDSN-certified Data Pools:
  http://www.gs1.org/productssolutions/gdsn/
- GS1 Data Quality Framework
  http://www.gs1.org/gdsn/dqf/data_quality_framework
- Creating a Source of Truth in Healthcare: Testing the GDSN as a Platform for the Healthcare Product Data Utility:
- GDSN Etoile 2007 Report: Lessons Learned -- GDSN and Interoperability:
  http://www.gs1.org/gdsn/ds/library
- Synchronising Product Data in Healthcare - Global GDSN Healthcare Pilot Report November 2008:
- Synchronization - The Next Generation of Business Partnering: How Leading Companies are Delivering Actual Results:
- Global Data Synchronisation At Work in the Real World - Illustrating the Business Benefits:
  http://www.gs1.org/docs/gdsn/gdsn_gci_capgemini_report.zip
- 1SYNC:
  http://www.1sync.org/home.html
Appendix A: GTIN Attributes for Healthcare Products

1 Global Trade Item Number (GTIN)
2 Pack Level
3 Manufacturer Part Number
4 Hierarchy (Parent GTIN)
5 Hierarchy (Child GTIN)
6 Hierarchy (Quantity of Children)
7 Publisher Global Location Number (GLN)
8 Target Market
9 Brand Owner and GLN
10 Manufacturer Name and GLN
11 Functional Name
12 Brand Name
13 Description
14 Height + Unit of Measure
15 Width + Unit of Measure
16 Depth + Unit of Measure
17 Gross Weight + Unit of Measure
18 Net Content + Unit of Measure
19 Consumer Unit Y/N
20 Orderable Unit Y/N
21 Invoice Unit Y/N
22 Shipping Unit Y/N
23 Base Unit Y/N
24 Variable Unit Y/N
25 Returnable Package Y/N
26 Marked with Lot Number Y/N
27 Bar code Type
28 GPC code
29 Optional Classification Agency
30 Optional Classification Agency Value
31 Start Date
32 Effective Date
33 Shelf Life From Production
34 Shelf Life From Delivery
35 Contains Blood*
36 Implantable*
37 Contents of Concern*
38 Reusability Types*
39 Brand or Generic Flag*
40 Does Product Contain Latex*

40 total

* These attributes are pending development, and at the time of publication of this document have not been released as part of the GDSN standard.

For a downloadable spreadsheet of the GTIN product attributes for healthcare go to http://www.gs1us.org/Default.aspx?tabid=210 and click on GTIN Attributes for Healthcare Products - Interactive Spreadsheet under “Additional Resources.” This spreadsheet allows users to view plain language definitions of the attributes and, by clicking on the various tabs, to review code lists of acceptable options for populating specific attributes.
Appendix B: GDSN Adoption Plan

Adoption of GDSN in Healthcare by 2012

Assumes an organization has completed Phase Two of the GTIN Implementation Plan and that manufacturers have assigned GTINs to their products.

Diagram 4: Adoption of the GDSN in Healthcare by 2012

- **Phase One: Commit**
  - Create awareness of GDSN and its benefits and obtain executive sponsorship to move forward with implementation.

- **Phase Two: Assess**
  - Perform gap analysis of GTIN attributes to determine what workflow changes are required to comply with GS1 standards and the GDSN.
  - Assess system’s ability to store, publish and maintain GDSN attributes.

- **Phase Three: Select**
  - Evaluate GDSN-certified Data Pools for the best fit with your organization’s business objectives.
  - Using appropriate selection criteria, select and subscribe to a GDSN-certified Data Pool.

- **Phase Four: Implement**
  - Prepare data by updating internal system(s) to close gaps identified in gap analysis and perform data quality/data cleansing activities.
  - Connect to the GDSN and load data.
  - Coordinate with customers. Confirm attributes to be published with data recipients. Test with customers and review test results.
  - Educate and train staff about your Data Pool and the GDSN.
  - Develop a maintenance plan and data governance procedures.
  - Begin synchronizing data.

- **Phase Five: Transact**
  - Begin transacting using data published through the GDSN.
  - Reassess business processes and refine to meet organization’s goals.

- **Phase Six: Maintain**
  - Manage new product introductions and product updates with trading partners.
  - Follow established governance plan for controlling data accuracy.
  - Measure and monitor EDI effectiveness (i.e., change in number of exceptions e.g., wrong/incorrect invoices, wrong unit of measure etc.).
  - Measure and monitor return on investment.

- **Manufacturer**
  - Perform an analysis to identify gaps between currently stored product attributes and GDSN healthcare attributes.
  - Assess system’s ability to receive, store, manage, use and maintain GDSN attributes.
  - Understand capability to integrate GDSN data with current information systems.

- **GPO**
  - Prepare data by updating internal system(s) to close gaps identified in gap analysis and perform data quality/data cleansing activities.
  - Connect to the GDSN.
  - Test with suppliers and review results.
  - Educate and train staff about your Data Pool and the GDSN.
  - Develop data governance procedures and a conceptual data integration plan.
  - Place subscription requests and onboard suppliers. Begin synchronizing data.

- **Distributor**
  - Develop tactical data integration plan.
  - Execute plan.
  - Reassess business processes and refine to meet organization’s goals.

- **Provider**
  - Develop tactical data integration plan.
  - Execute plan.
  - Begin transacting using GDSN data.
  - Reassess business processes and refine to meet organization’s goals.

Update product item master.
Evaluate new attributes as necessary.
Follow established governance plan for controlling data accuracy.
Appendix C: GDSN-certified Data Pools in the U.S.

The following is a list of all GDSN-certified Data Pools in the U.S. as of the date of this publication. An up-to-date list can be found at any time on the GS1 GDSN website at: http://www.gs1.org/productssolutions/gdsn/

For more information about the criteria and process for certifying GDSN Data Pools, please visit the GDSN website shown.

<table>
<thead>
<tr>
<th>COMPANY</th>
<th>DATA POOL NAME</th>
<th>CONTACTS</th>
<th>ADDRESS</th>
<th>WEBSITE</th>
</tr>
</thead>
</table>
| 1SYNC (formerly Transora & UCCnet) | Item Management Release 6.2.2 | Scott Brown  
Director, Global Standards  
609-620-4681  
sbrown2@gs1us.org | 1009 Lenox Drive  
Suite 115  
Lawrenceville, NJ 08648 | www.1sync.org |
| Big Hammer Data | Product Registry v2.1 | Jay S. Yanko  
Director, Global Data Synchronization  
262-953-8102  
yanko@bighammer.com | N16 W23233 Stone Ridge Dr.  
Suite 270  
Waukesha, WI 53188 | www.bighammer.com |
| GHX | GHX Health ConneXion™ | MJ Wylie  
303-961-7050  
mjwylie@ghx.com | 1315 W. Century Drive  
Louisville, CO 80027 | www.ghx.com |
| SA2 Worldsync GmbH  
(a joint venture of Agentrics and SINFOS GmbH) | Gensync v5.0 & SINFOS v2.1 | Gina Baker  
703-234-5215  
gbaker@sa2worldsync.com | 625 N. Washington St.  
Suite 400  
Alexandria, VA 22314 | www.sa2worldsync.com |
| Synquinox | Synquinox | TJ Charles  
Dir of Business Development  
(702) 948-6376 ext 311  
tj.charles@synquinox.com | 720 South 4th Street  
Suite 300  
Las Vegas, NV 89101 | www.synquinox.com |

Table 3: GDSN-certified Data Pools in the U.S.
# Appendix D: Acronym List

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AS2</td>
<td>Applicability Statement 2</td>
</tr>
<tr>
<td>CIC</td>
<td>Catalogue Item Confirmation</td>
</tr>
<tr>
<td>FTP</td>
<td>File Transfer Protocol</td>
</tr>
<tr>
<td>GDSN</td>
<td>Global Data Synchronization Network</td>
</tr>
<tr>
<td>GLN</td>
<td>Global Location Number</td>
</tr>
<tr>
<td>GTIN</td>
<td>Global Trade Item Number</td>
</tr>
<tr>
<td>GUI</td>
<td>Graphical User Interface</td>
</tr>
<tr>
<td>UNSPSC</td>
<td>United Nations Standard Products &amp; Services Code</td>
</tr>
<tr>
<td>XML</td>
<td>Extensible Mark-up Language</td>
</tr>
</tbody>
</table>
About GS1® and GS1 US™

About GS1®
GS1 is a neutral, not-for-profit organization dedicated to the design and implementation of global standards and solutions to improve the efficiency and visibility in supply chains. GS1 is driven by more than a million companies, who execute more than six billion transactions a day with the GS1 System of Standards. GS1 is truly global, with local Member Organizations in 108 countries, with the Global Office in Brussels, Belgium.

About GS1 US™
GS1 US is the Member Organization of GS1 that serves companies in the United States. As such, it is the national implementation organization of the GS1 System dedicated to the adoption and implementation of standards-based, global supply chain solutions in the United States. GS1 US currently serves over 200,000 U.S. member companies -- 16,000 of which are in healthcare.

About GS1 Healthcare
GS1 Healthcare is a global, voluntary healthcare user group developing global standards for the healthcare supply chain and advancing global harmonization. GS1 Healthcare consists of participants from all stakeholders of the healthcare supply chain: manufacturers, wholesalers & distributors, as well as hospitals and pharmacy retailers. GS1 Healthcare also maintains close contacts with regulatory agencies and trade organizations worldwide. GS1 Healthcare drives the development of GS1 standards and solutions to meet the needs of the global healthcare industry, and promotes the effective utilization and implementation of global standards in the healthcare industry through local support initiatives like GS1 Healthcare US in the United States.

About GS1 Healthcare US™
GS1 Healthcare US is an industry group that focuses on driving the adoption and implementation of GS1 standards in the healthcare industry in the United States to improve patient safety and supply chain efficiency. GS1 Healthcare US brings together members from all segments of the healthcare industry to address the supply chain issues that most impact healthcare in the United States. Facilitated by GS1 US, GS1 Healthcare US is one of eighteen local GS1 Healthcare user groups around the world that supports the adoption and implementation of global standards developed by GS1.

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