Data Standards in Healthcare Supply Chain Operations

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Abstract

This paper presents the challenges and benefits associated with adoption of healthcare supply chain data standards in a hospital environment. In a highly fragmented industry like healthcare with several stakeholders, the adoption and use of common data standards for identifying delivery locations and products is critical. Common data standards ensure system wide interoperability and visibility across the supply chain, contributing to improvements in patient safety and streamlined internal and external supply chain operations. However, the global healthcare industry has been significantly slow in adopting data standards in comparison to other industries like retail, manufacturing. We discuss the results from data standard adoption pilot project conducted by Center for Innovation in Healthcare Logistics (CIHL), University of Arkansas at Washington Regional Medical Center, a 325 bed not-for-profit hospital in Fayetteville, Arkansas. CIHL data standards pilot involved studying the existing supply chain processes, design, pilot-test, and evaluation of GS1 data standards adoption over a sample of products and a single delivery location at the hospital. We present the results, which demonstrate the capabilities of systemwide improvements and roadblocks likely to be encountered. Findings from the pilot can be expanded to develop a broad implementation plan of data standards adoption for healthcare providers.

Keywords
Healthcare Supply Chain, Healthcare IT, Material, Information and Process Flow, GS1 Data Standards.

1. Introduction

The complex nature of healthcare supply chains has intensified the need to share accurate and timely information about products and locations. The information disconnect and the rising costs of products in the healthcare supply chains calls for employing effective supply chain management practices. The cost of supplies constitute the second largest expense for healthcare providers [1], yet supply chain has been ignored and failed to take advantage of advanced developments in technologies and practices employed by other industries several decades ago. Data Standards (DS) in the healthcare supply chain are representations of unique, unambiguous, common information relating to products and location, which are fundamental to the effective information exchange throughout the supply chain. This information exchange refers to both within the hospital (internal) and among trading partners (external). The presence of common data standards ensure the correct material is delivered at the right location, in the right quantity at the right time and contributes to increased patient safety. Currently the healthcare supply chain has not widely adopted data standards. That is, there is no agreement on the identification standards (product and location) to be used by all players in the supply chain. The use of internal identification numbers is more prevalent; leading to staggering amounts of confusion, supply chain process inefficiency, and lack of visibility to track the product flow. From the healthcare provider point of view, more than 30% of hospital expenses are related to material procurement and supply chain management activities [2]. The administrative costs along healthcare supply chain constitute roughly 30% to 40% of healthcare costs as compared with 3% to 6% in the retail industry [3]; around 24% of supply administration time is spent on data management, cleansing and reconciliation efforts [4]. An industry survey reported providers spent over 7% on contracted price for medical surgical products, as the provider account number was wrongly identified leading to the confusion on tier-pricing[4]. Contrary to the healthcare industry, data standards have been a huge success factor...
Data standards also known as identification standards have their origin in the retail industry with the development of the Universal Product Code (UPC) in 1974. The use of identification standards within healthcare was started in 1983 by the Health Industry Business Communication Council (HIBCC) and during the same time the use of barcode technology was widely promoted among hospitals. HIBCC standards were developed as specific healthcare standards in contrast to the Uniform Code Council (UCC) standards developed and used by several industries such as retail. Supply chain data standards are developed and promoted by standards organization like GS1 (formerly UCC EAN) or the Health Industry Business Communication Council (HIBCC). GS1 is a not-for-profit organization dedicated to the design and implementation of global standards to improve the efficiency and visibility of supply chains globally and across sectors. It has over 35 years of experience and 108 member organizations around the world. The basic set of GS1 identification standards include Global Trade Identification Number (GTIN) for product identification, the Global Location Number (GLN) for trading partner identification and the Global Data Synchronization Network (GDSN) provides a synchronization mechanism for sharing accurate product information between manufacturers, distributors, GPOs and healthcare providers are best known as the 3Gs of healthcare. HIBCC was founded in 1983 as a standards development organization for healthcare-related issues, including medical device identification. HIBCC develops and maintains accredited e-commerce and product identification standards which are approved by international standards bodies, including the American National Standards Institute (ANSI) and the International Organization for Standardization (ISO), and endorsed by the Food and Drug Administration (FDA). The basic set of HIBCC standards includes Labeler Identification Code (LIC), Health Industry Number (HIN) and Health Industry Bar Code (HIBC). Parallel to industry developments the FDA has also contributed to the development of standards by setting regulations for pharmaceutical products and efforts are underway for medical products and devices. Currently medical devices do not have a specific identification code, the Department of Defense (DoD) developed the Universal Product Number (UPN) in 1995 commencing early efforts to standardize medical supplies. Table-1 provides a snapshot of the issues and percentage of errors due to lack of data standards and findings from the Department of Defence data synchro-
nization efforts. The common theme reflects the lack of consistent product identification by all stakeholders in the healthcare supply chain and the errors are increased at the provider end.

A unique identifier for healthcare products like NDC, GTIN helps to standardize communications, reduce errors in product identification and transactions across the healthcare supply chain. However, in other industries it has been found that product data inaccuracies and errors still occur but are rapidly updated. Manual error correction is labor intensive and creates significant inefficiencies and costs to overall effectiveness of the system. The Department of Defence took a significant lead in creating a product data utility (PDU) which is a centralized content repository of product data procured and used at various DoD hospitals and Veterans Affairs (VA). The purpose of a PDU was to enable standardization, synchronization and maintenance, providing accurate product information from the manufacturer throughout the supply chain in near real time [9]. Every organization in the healthcare supply chain could develop a PDU but the challenge is on the integration and maintenance of unique product and data standards information. To address this problem GS1 operates Global Data Synchronization Network (GDSN), the key role of GDSN is to exchange unambiguous product data and its associated attributes (e.g. description, packaging quantity and dimensions etc.) [10] throughout the healthcare supply chain. Currently the GS1 standards are gaining wide recognition and consensus among healthcare supply chain members. In 2008 an industry movement towards the adoption of GS1 standards was initiated in United States and several members of healthcare supply chain are in various stages of implementation. In this paper we shall restrict our attention to adoption and implementation of GS1 based standards due to global use and broad acceptance, although the key concepts expressed in this paper could be applied to any set of standards when implemented throughout the healthcare industry.

3. Pilot Studies and their limitations

Over the recent years several pilot studies primarily documented the possible benefits of implementing GS1 standards in the healthcare industry. Pilot studies were undertaken to establish whether business practices can align, information systems can interface with ancillary systems in the highly fragmented healthcare supply chain. This section presents a brief description of the most relevant pilots and their findings:

- **Department of Defense (DoD) Data Synchronization Pilot**: The earliest efforts of standardization was initiated by the DoD in 1995 with the development of the Universal Product Number (UPN) and the posterior introduction of the Product Data Utility (PDU). The PDU is a central repository of item related information that was kept centralized in order to provide accurate information to all the players involved. Under the same concept the DoD began a pilot in 2003 to test effectiveness of Global Data Synchronization Network (GDSN) as a PDU for the healthcare industry. The pilot began in concert with the U.S Department of Veterans Affairs (VA) by a Phase 1 focusing on standardizing the data records for internal DoD and VA operations. Then in the beginning of 2004, project Phase 2 joined two healthcare manufacturers, a distributor, and a hospital network with GS1 and onboarding support provided by Ontuet. During this phase, 10 items were selected and traced through the entire planned synchronization network, identifying what tasks had to be done, demonstrating how those could be accomplished within normal business practices. Phase 2A of the DoD pilot finished in 2007, concluding that the GDSN vision for healthcare adaptability was technologically feasible [11].

- **Monash Pharmaceutical Supply Chain Pilot**: This pilot began in 2004 with the purpose of demonstrating the benefits of implementing GS1 standards within the Australian pharmaceutical supply chain. The Phase 1 of Monash pilot involved the Monash Medical Centre Pharmacy Department along with three suppliers and other stakeholders, including Health Purchasing Victoria, the National Supply Chain Reform Task Force, Pharmhos Software and EAN Australia. The pilot project team established a month long demonstration of an automated e-commerce supply chain between the Pharmacy and its distributors. The project also highlighted a need for an entire industry requirement to have a single source of GS1 barcode numbers for data synchronization purposes. Phase 1 of Monash Pharmacy pilot project was a demonstration of electronic messaging using the GS1 standards within the hospital pharmaceutical supply chain [12]. It successfully proved the application of the GS1 system identification, bar coding and electronic messaging in the areas of ordering, picking, packing, dispatching and receiving of goods. The benefits measured during Phase 1 include 25 percent reduction in receiving time and improved accuracy in order fulfillment. The Phase 2 of the project began in 2005 and involved more manufacturers and two major wholesalers. Three areas of implementation of the GS1 standards were identified for the Phase 2 project scope. Those were driven by the learning from Phase 1 demonstration: identification and bar-coding of trade items, electronic messaging and improving order fulfillment accuracy, and data synchronization...
via the National Product Catalogue (NPC) [13]. Phase 3 started in early 2008 and is intended to further refine and improve the supply chain efficiency of the organizations involved.

- **Minnesota GLN Pilot:** The Minnesota GLN pilot’s goal was to explore the GLN requirements for the healthcare supply chain using information and product flow. Three major hospitals in Minnesota, a distributor, a GPO and a manufacturer participated. The Phase 1 of the project concluded in 2007, explored the issues in making the GLN work with existing systems and business processes. The associated report GS1 US Minnesota GLN Pilot Report Phase 1 [14] offers detailed recommendations for provider organizations willing to implement GLN effectively. For the project Phase 2, the original participants were joined by a new manufacturer and a distributor. The final report [15] provides recommended process maps for key supply chain business processes related to GLN associated transactions and GLN registry maintenance.

- **Global GDSN Pilot:** The purpose of global pilot was to demonstrate the GDSN capabilities across international borders. Three manufacturers participated in the pilot from the supply side in Australia. The demand side from the US was represented by a couple of GPOs and healthcare providers. The data pools (GS1net - Australia and 1SYNC-US) and Ontuet enabled data synchronization efforts through the GDSN. More than 2,500 GTINs were exchanged among the pilot participants and the pilot demonstrated that the GDSN provides adequate infrastructure to successfully exchange data between data pools across international borders and facilities synchronization across the entire length of the supply chain (manufacturer, distributor, GPO and healthcare provider). The findings of the global pilot [16] demonstrated that pilot participants experienced little change in current business processes indicating the solution is portable and scalable. The implementation can be smooth if there is a broad agreement on the required data attributes to synchronize healthcare items. The future steps of this pilot includes several players in the US planning migration to GDSN production and continue its production roll-out of the national product catalogue in Australia.

- **Mayo GLN Pilot:** This pilot was conducted in order to establish the basic requirements for the use of GLNs between a healthcare provider and a distributor. Mayo Clinic implemented standardized identifiers (GLNs) for their existing account numbers and delivery locations as the first step in their effort to fully support the adoption of GS1 standards. The pilot demonstrated that the implementation of location identifiers is an easy process and it could be performed in weeks instead of months or years with adequate support from MMIS/ERP packages to store, process and use GS1 standards in routine business transactions. The lessons learned and implementation steps are documented in a comprehensive report [17] to aid providers interested in GLN implementation.

- **BD Seton Family Pilot:** The goal of this pilot was to use the 3G’s of GS1 standards to improve transactional effectiveness between a healthcare provider and a manufacturer. In September 2008, Seton Family of Hospitals (member of Ascension Health) placed an order with a major product manufacturer, this order was the first documented transaction between a major healthcare provider and a supplier using an integrated set of GS1 standards, the GLN (for the identification of hospital locations) along with the the GLN registry (storage and listing of Seton GLNs) and the GTIN for product identification and the GDSN (storage, sharing and validation

<table>
<thead>
<tr>
<th>Type of Problem</th>
<th>Manufacturer</th>
<th>Distributor</th>
<th>GPO</th>
<th>Provider</th>
</tr>
</thead>
<tbody>
<tr>
<td>Missing Middle Packaging Levels</td>
<td>15-20%</td>
<td>1-4%</td>
<td>20-25%</td>
<td>15-25%</td>
</tr>
<tr>
<td>Hard “Packaging Quantity” Errors</td>
<td>1%</td>
<td>1%</td>
<td>2%</td>
<td>2-5%</td>
</tr>
<tr>
<td>Unit of Measure Confusion/Misuse</td>
<td>2-6%</td>
<td>1-3%</td>
<td>2-5%</td>
<td>Unknown</td>
</tr>
<tr>
<td>Missing Packaging- not middle level</td>
<td>3-8%</td>
<td>3-8%</td>
<td>3-7%</td>
<td>5%</td>
</tr>
<tr>
<td>Manufacturer Name Problems</td>
<td>n/a</td>
<td>2-5%</td>
<td>1-4%</td>
<td>30%</td>
</tr>
<tr>
<td>Obsolete Products</td>
<td>1-4%</td>
<td>2-5%</td>
<td>1-8%</td>
<td>5-15%</td>
</tr>
<tr>
<td>Missing Product Brand Names</td>
<td>2-5%</td>
<td>5-10%</td>
<td>5-10%</td>
<td>20-25%</td>
</tr>
<tr>
<td>Incomplete Item Description</td>
<td>5-15%</td>
<td>3-12%</td>
<td>5-15%</td>
<td>10-20%</td>
</tr>
<tr>
<td>Wrong Customer Unit Price</td>
<td>Unknown</td>
<td>1-2%</td>
<td>n/a</td>
<td>1-2%</td>
</tr>
<tr>
<td>Customer Paid more than Contract Price</td>
<td>n/a</td>
<td>Unknown</td>
<td>n/a</td>
<td>3-6%</td>
</tr>
</tbody>
</table>
of product information)[18]. The observed benefits include one source of product data, perfect alignment on contract eligibility, no unit of measure EDI errors and clarity on manufacturer ID. The lessons learned are an initial step for several healthcare providers to fulfill the requirements of a perfect order cycle.

The various pilot studies have demonstrated the use and applicability of GS1 standards play across the different parts of supply chain; but the real challenge in adoption and use of GS1 standards lies with healthcare providers, the system and process level changes has not been fully explored within the hospital supply chain. CIHL pilot presents some new insights on the benefits. In the next section we shall discuss some of the challenges to the healthcare provider in successfully implementing supply chain data standards.

4. Challenges in Implementing Data Standards

Healthcare providers face very different challenges from other players in the supply chain towards adopting data standards. In order to successfully implement data standards healthcare providers will need to invest in technology solutions. Technology solutions plays a key role in standards adoption and can be classified in two types; (i) Auto Identification and Data Capture (AIDC) such as barcode or Radio Frequency Identification (RFID) are essential to eliminate data entry related errors and (ii) Information systems (i.e., MMIS- Materials Management Information Systems or ERP-Enterprise Resource Planning) to store, process and use the standards in routine business transactions and reporting. The current level of adoption of AIDC technologies is critically low at the healthcare provider level, as shown by a recent American Hospital Association survey [19]; 16% of hospitals fully using barcode technology, and only 3% use RFID for supply chain management purposes. Also, most Information systems in use at hospitals lack dedicated searchable fields, to store and integrate with other applications, like automatic dispensing cabinets, clinical and billing systems. Implementing standards at healthcare providers requires the use of GTINs in place of product numbers and GLNs instead of customer account numbers. If all products had a standard barcode containing GTINs including secondary product attributes like lot number, expiration dates etc., then medications could be ordered, scanned, documented, and tracked using a GTIN through the entire process. Currently, due to the lack of a standardized barcode, internal labels, numbers, and locations are scanned instead of the information contained on the product packaging. Utilizing GS1 standards enables scanning of the actual product, which enhances patient safety by preventing human errors and reduces infrastructure, supply, and labor costs, also eliminating the need for internal repackaging and rebarcoding. Ultimately, GS1 standards will influence the adoption of bedside point of care (BPOC), which is a proven and well documented as a best practice for increased patient safety in healthcare. GS1 standards provides a standard barcode which enables healthcare players to utilize accurate product information, expiration dates and lot numbers. The expiration date and lot number can be checked throughout the medication administration process. By scanning the barcode in the product AIDC systems parse the product information, the expiration date can be compared with a fixed date avoiding adverse events. Additionally, the information system can also maintain a table of recalled medications identified by their GTINs and their lot numbers and every time a medication is scanned through the process, this table can be checked to ensure the safety of the medication. GS1 data standards can also contribute to visibility of the supply chain enabling track and trace capabilities of the recalled products. Since GTIN’s are global identifiers of a product, it will be extremely valuable to document the product ID in a patient’s clinical record enabling hospital systems to identify the products that were administered to the patient. Apart from the system level challenges, hospitals have to streamline internal processes such as requisitions, replenishment, receiving, PAR management, ordering etc. with accurate product and location identifiers. Automating the processes using AIDC infrastructure can avoid manual, erroneous, labor intensive tasks. More importantly, adoption should be well coordinated with product suppliers and software vendors in order to achieve significant results and savings.

4.1 Pharmacy Operations

The initial goal of the CIHL pharmacy pilot was to illustrate the benefits of GS1 standards to hospital providers. Unfortunately, due to technology challenges a pilot study was not feasible. The primary technology challenges in pharmacy were (i) Pharmacy/ clinical software will need to be able to process and store 13 (GLNs) and 14 (GTINs) digit numeric identifiers, (ii) barcode information will need to be parsed to separate the GTIN number, expiration date, and lot number, and (iii) equivalent medications from different manufacturers will contain different GTINs, thus need to be hierarchically structured and stored in the pharmacy formulary database. These three challenges are elaborated in more detail: (i) Pharmacy systems need to be able to store and process 13 and 14 digit numerical identifiers. This includes software associated with ordering, receiving, storing, picking, administration, and billing. While the majority
of the software used for pharmacy supply chains functions are capable of handling these storage requirements, the supplier/wholesaler’s ordering software is not equipped to handle these changes. Currently, the hospital’s ordering system has account numbers with 5 digits and item numbers with 6 digits. Retrofitting their current software to be able to accommodate GTINs (14 digits) in the item number field and GLNs (13-digits) in the customer number field is not a simple task in distributors software systems built on legacy custom code. (ii) In pharmacy applications, a standard GS1 barcode has the GTIN, followed by the expiration date, and lot number, separated by application identifiers. In order to meaningfully use the GS1 barcode, the barcode will need to be parsed to separate the GTIN, expiration date, and lot number. Additionally, these fields will need to be stored and accessed throughout the pharmacy process. Currently, the pharmacy’s database system does not have capabilities of parsing and storing this information. (iii) Equivalent medications from different manufacturers will have different GTINs. Currently, equivalent medications are stored in the same carousel shelf and automated dispensing cabinet location. Carousel and automated dispensing cabinets need to be able to either store multiple GTIN numbers within a single bin location or a hierarchy for equivalent medications needs to be established in the GDSN and accessed by various allied systems used in the pharmacy.

5. Pilot Study and Results

This section provides description on CIHL’s collaboration with Washington Regional Medical Center (WRMC) towards implementation of GS1 data standards in their medsurg supply chain operations. The project spanned from March 2009 to December 2010 and included an initial study and design phase followed by implementation and pilot run. The medsurg pilot involved studying existing processes, implementing barcode automation of picking and cart count operations, selecting a sample of medical surgical items, clinical locations and implementing GTINs and GLNs on related processes and subsequently identifying opportunities, barriers, and workarounds to quantify the benefits of GS1 implementation. The pilot implementation involved identifying a sample of products (around 135 SKUs), vendors and PAR locations. WRMC would generate separate purchase order for the specified pilot items; the orders would be processed by the distributor and the shipment sent the next day to the healthcare provider. At the healthcare provider the orders would be received at the receiving dock. The on-hand inventory in the MMIS system would be incremented after the product is put away in the storeroom. Separate bin locations were created for the pilot sample to avoid confusion to the internal replenishment process. The product were be picked from these specified bin locations in order to fill the pick tickets generated based on the replenishment orders sent from the study units. Once the pick tickets are filled they would be delivered to the specific floor. The impact of data standards implementation was observed for a period of 12 weeks.

Inventory Accuracy: The inventory accuracy of CIHL and non CIHL locations in the storeroom was observed for 10 weeks (Feb 22 to May 2, 2010). In order to calculate the inventory accuracy, a physical inventory count was performed twice a week and then each count was compared to on-hand inventory shown in the MMIS. The percentage of correct counts (perfect) was recorded, i.e. whether the physical inventory is the same as on-hand inventory shown in the MMIS. The inventory accuracy indirectly measures the accuracy of data capture at different stages of supply chain operations. Standards adoption is anticipated to improve this accuracy of item identification and hence improves inventory accuracy. It was found that the inventory accuracy for non CIHL locations were about 50%. The inventory accuracy was found higher for CIHL locations 60.2%.

Pricing discrepancies: A sample of 135 medical surgical items was observed over a period of 11 weeks. The pricing mismatch between purchase order, its corresponding invoice and subsequent price change was recorded. Data standards pilot observed the price change generated by the exception report from their MMIS. A total of 343 POs were generated in 11 weeks with an aggregate total of 638 PO lines (i.e. approximately 3 lines per PO) the following changes were observed: 7 pricing discrepancies, Average of 5.4 minutes to fix. WRMC has over 45000 items both stocked and non-stocked. The price discrepancy occurred for 1508 items were observed across 11 weeks. The projected time required for exception handling for these price discrepancies is approximately 135 hrs. An estimate of 12 hours per week spent on pricing exception handling can be eliminated by implementing GS1 standards in GPO Rostering, contract management, EDI transactions (PO, Invoices etc.), sales tracing etc.

Inventory Savings: Before the pilot study, the inventory was counted and new PAR levels were established based on usage patterns PAR location at selected for 52 weeks. The following table shows the total inventory value before the PAR levels were set and the savings gained with new PAR levels post implementation. PAR levels were calculated using the equation PAR = [Demand/50].
Table 2: Savings from PAR Management

<table>
<thead>
<tr>
<th>PAR Location</th>
<th>Pre Implementation</th>
<th>Post Implementation</th>
<th>Inventory Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SKU’s On Hand Inventory</td>
<td>SKU’s Current Inventory</td>
<td></td>
</tr>
<tr>
<td>5 South</td>
<td>31 $50,646.31</td>
<td>11 $36,317.21</td>
<td>$14,329.10</td>
</tr>
<tr>
<td>4 South</td>
<td>28 $26,261.83</td>
<td>13 $8,636.70</td>
<td>$17,625.13</td>
</tr>
<tr>
<td>Womens-Children</td>
<td>23 $13,820.71</td>
<td>12 $7,663.07</td>
<td>$6,157.64</td>
</tr>
<tr>
<td>PeriOp</td>
<td>30 $11,610.19</td>
<td>18 $6,352.26</td>
<td>$5,257.93</td>
</tr>
<tr>
<td>TOTAL</td>
<td>112 $102,339.03</td>
<td>54 $58,969.24</td>
<td>$43,369.79</td>
</tr>
</tbody>
</table>

Productivity Improvements:

- Cart Count/ Floor Requisitioning: The cart count staff productivity showed considerable improvement. The estimated average count time with barcode enable process per item is 19.6 seconds as compared to 57 seconds for manual cart count which is 65.6% savings.

- Picking: The picking productivity also showed considerable improvement. The estimated average pick time per item is 12.8 seconds which is 57.9% savings compared to 30.4 seconds per item before the implementation. The estimated average time associated with requisition generation with the baseline metric was 57.0 seconds per item compared to post implementation duration of 19.6 seconds, leading to 65.5% savings. The average time across all the process was reduced by 55 seconds per product. The reduction in inventory handling time by clinician staff were be utilized towards patient care. Picking and staging for automated open shelf item was reduced to 27.7 second post implementation. Compared to the time required through automated dispensing cabinet (such as Omnicell), 25.7 seconds, for the same process, the difference between productivity from picking using Omnicell and automated open shelf system was not significant. The total savings due to open shelf automation led to 35.9% reduction, with 153.2 seconds in pre implementation to 98.2 seconds post implementation per item.

Table 3: Productivity Savings Barcode based automation

<table>
<thead>
<tr>
<th></th>
<th>Pre Implementation</th>
<th>Post Implementation</th>
<th>Reduction in time spent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requisition</td>
<td>57.0 seconds</td>
<td>19.6 seconds</td>
<td>65.60%</td>
</tr>
<tr>
<td>Picking</td>
<td>30.4 seconds</td>
<td>12.8 seconds</td>
<td>57.90%</td>
</tr>
<tr>
<td>Overall</td>
<td>153.2 seconds</td>
<td>98.2 seconds</td>
<td>35.90%</td>
</tr>
</tbody>
</table>

6. Conclusions
The objective of the pilot at WRMC was to implement GS1 standards on external and internal supply chain operations of a hospital. It was established that support of technology solutions, more particularly from the materials management information systems and cooperation with supply chain trading partners is critical in order to successfully implement GS1 based standards. The implementation demonstrated the feasibility of using GS1 identifiers on basic hospital supply chain processes without significant process changes and the benefits of the using of barcode enabled processes in PAR management and inventory control. The quantifiable impacts related to increased productivity and reducing the clinical staff intervention during replenishment process frees up nursing time. It was observed that excessive stock was stored, due to poor inventory visibility in the floors areas leading to higher holding costs and increased risks of product expiration and outdates. The pilot scored the importance of barcode based automation for supply chain processes and established the strong need for data standards adoption throughout the healthcare supply chain. The pilot demonstrated several opportunities for improvement. CIHL researchers are confident that systemwide implementation will result in tremendous cost savings, productivity improvements and enhanced patient safety. CIHL recognizes that sequential implementation approach and GS1 identifier based anchoring can avert major process changes which encourages wide spread adoption of GS1 based supply chain data standards, leading way to significant cost saving opportunities and enhanced patient safety.

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References


