United States

Leveraging standards for inventory visibility

Challenge

Geisinger Health, like many large-scale healthcare institutions, used manual processes to store and re-plenish medical supplies. These processes can be prone to error.

Solution

Geisinger made an investment in technology that uses the latest identification standards for medical devices to eliminate manual processes, beginning in areas that use life-saving implants, such as cardiac catheterisation labs.

Geisinger teamed with Owens & Minor to implement QSight®, a cloud-based inventory management sys-tem, to leverage the data in barcodes affixed to medical devices for the US Food and Drug Admin-istration (FDA) unique device identification (UDI) rule. Geisinger can easily capture and store a prod-uct's Global Trade Item Number® (GTIN®) – the most widely used UDI standard – and other critical data with a simple scan.

Elimintate manual processes

Identification standards for medical device

Investment in the latest identification technology

Cloud-based inventory system
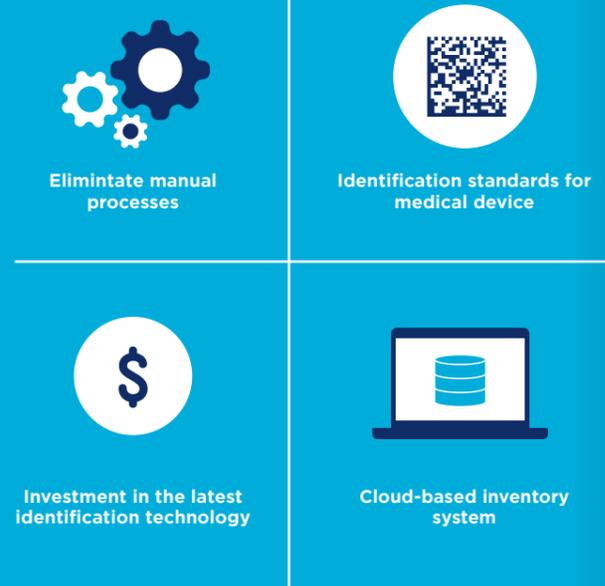
Benefits

- **Accuracy, efficiency, productivity.** Multiple clinical professionals within the healthcare system are no longer tasked with manual re-cord-keeping rife with error. A simple barcode scan places a product into inventory. Sub-sequent scans track its lifecycle throughout the healthcare system, recording where and whether it is used, disposed of, returned, or recalled.

- **Profitability.** Inventory management elimi-nates waste, guaranteeing supplies are not over-ordered and that products are used prior to expiration. It also delivers fiscal benefits by enabling automated centralised purchasing on behalf of large institutions like Geisinger.

- **Patient safety.** Inventory management as-sures patients that any tissue or implant used in their treatment is readily available. It allows clinicians to interface with both the electron-ic medical record (EMR) and an individual's electronic health record (EHR) with detailed record-keeping for more accurate documen-tation.

- **Future-proofed planning & implementation.** Through its inventory management initiative, Geisinger has established a baseline for sys-tem-wide data quality that will enable future operations and initiatives, including accu-rate and efficient recall management and ad-vanced analytics related to cost and patient outcomes.

Geisinger Health has been a leader in health-care innovation, seeking solutions to modern healthcare challenges and adopting technol-ogies in service of its patients, caregivers, students, and community. This commitment to innovation is one of the reasons Geisinger Health can boast more than a century of ser-vice to its Pennsylvania communities, and why research and consulting firm Gartner consist-ently ranks Geisinger in the Healthcare Supply Chain Top 25.

What truly sets Geisinger apart is exceptional due diligence in leveraging every possible ca-pability from the supply chain. At Geisinger, any new technology implemented to meet a challenge is scrutinised for features that can introduce efficiencies to other departments, other practices, other facilities.

"Technology right out of the box might have more capability than you initially need, but you need to create a roadmap for enabling other features that will increase the performance of the business," says Kevin Capatch, director of process engineering at Geisinger Health.

A case in point is Geisinger's comprehensive data and inventory management programme that uses increasingly critical supply chain data to drive patient safety within its areas of care. Geisinger leverages the same codes re-quired by the US Food and Drug Administra-tion (FDA) regulations for unique device iden-tification (UDI) and automatic identification and data capture (AIDC) encoded on medical devices to identify products in inventory.

Pencil and paper to keyboard

"Over a decade ago, I watched as a well-inten-tioned cardiac catheterisation technician man-aged his inventory storage area using paper and pencil, then keyed his shopping list into an enterprise resource planning (ERP) system tem-plate to reorder," says Mr Capatch.

Manual processes like these were rife with po-tential for error and were occurring in every procedural area of the Geisinger system. More-over, hospital technicians might be tempted to over-order or unintentionally pass over products close to expiration, costing the institution valu-able resources or – worse yet – leaving staff fac-ing an out-of-stock on a critical device needed by a patient.

And with no system to manage the dates, ex-pirations were inevitable. "The combination of capturing information with a barcode scan and having a system that can use and act on that captured information has allowed Geisinger to turn the tide on managing expirations in our pro-cedural areas."

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Director of Process Engineering, Geisinger

After this encounter, Geisinger opted to intro-duce technology that would eliminate manual processes governing inventory and eliminate the three "nevers" in healthcare supply chains: never run out of a critical product, never waste inven-tory due to product expiration, and never fruit-lessly search for recalled items.

Geisinger teamed up with Owens & Minor, a global healthcare solutions company, to use its QSight® inventory management platform.

"QSight gives us product visibility from the mo-ment a product comes into Geisinger, until it is either used with a patient, expired, disposed of, returned, or recalled," Mr Capatch says. "It brings inventory control, it brings functionality for recalls, it brings expiration management, it brings lot and serialisation control – the inherent benefits we set out to acquire by instituting an inventory management program."

A standard of supply chain care

Data standards development had been under-way for a few years when Geisinger and O&M began working together. In fact, data standards development continues to this day throughout healthcare and adjacent industries. As Mr Cap-atch points out: "You must enforce [standards] in all disciplines: internally in your technology, in your business processes; externally with your vendor community and your solution providers."

GS1 standards – including Global Trade Item Numbers (GTINs) and Global Location Numbers (GLNs) – are the preferred and prevalent standards used by the healthcare community, pharmaceutical firms, medical device manufacturers and distributors, and are accredited by the FDA to support UDI implementation for all classes of medical devices. Some 87 percent of all UDI submissions utilise GS1 standards, which work in conjunction with standards unique to healthcare[1]. But many entities in the healthcare ecosystem have yet to adopt GTINs and GLNs, which adds a level of complexity to any inventory management effort.

"We are proponents of GS1 standards. If a vendor is on the fence, or deciding about upgrading business systems, we strongly encourage them to move to GS1 standards. Theirs are more global. It's a lot easier to interpret [GS1] application identifiers. This was an integral part in choosing our solution," says Mr Capatch.

Quality of data care

Data quality is imperative for optimal performance: it allows for seamless digital communications among systems, allows UDI data supplied by manufacturers to be used with confidence, and it powers inventory management.

"The importance of data quality is incalculable. Without clean data and a 'single version of truth' for all products coming into your system, you are hamstrung in what you can accomplish," Mr Capatch says. "That is why we benefitted from teaming up with a solution partner that made an investment in managing the item master data using standard identifiers where available, and we did not have to duplicate their efforts, just leverage them."

"When working with a new client, the first thing we do is data cleansing," says Vicky Lyle, vice president of industry associations at Owens & Minor. "We go into a [customer] department, scan each instance of every single product in that department to make sure the product exists in the global item master. In the instance where a product is not in the database, we utilise the GTIN to source the data from the GUDID [Global Unique Device Identification Database] or directly from the manufacturer's site."

Affiliates within the Geisinger system use QSight's highly enriched item master database. A scan of GS1 barcodes on any given facility's stockroom shelf will yield a product match of up to 95 percent. Once a product is added in the global item master, it is available for any customer that scans GS1 barcodes.
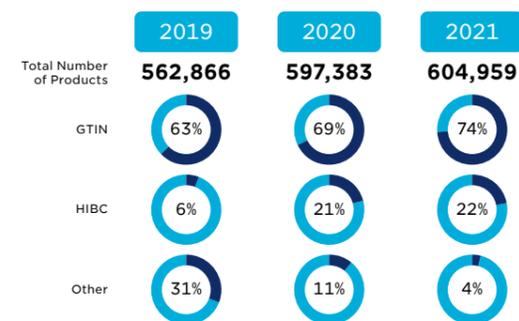
In the age of Big Data, hospitals are faced with collecting and interacting with massive amounts of data for thousands of products, most of which carry enriched attributes that go beyond manufacturers' production information. A standards-based inventory management system provides a secure repository and communications nucleus, bringing value to healthcare facilities like Geisinger needing to leverage the data in several vital ways, including patient safety.

Distribution of device identifiers in QSight®

Currently, QSight has over 600,000 stock keeping units (SKUs) in its cloud-enabled database, which is available to all customers, with 74 percent of SKUs tied to a GS1 Global Trade Item Number® (GTIN®). QSight allows for flexibility so that these alternate identifiers can be "tied" to the GS1 GTIN, when necessary, and supports the industry transition from proprietary identifiers to the standards-based UDI. QSight enhances its databases constantly when additional products are scanned by customers. And because it is cloud-based, the collective information is available to all customers as the scanning takes place, consistently recognising a product via the GTIN encoded as the unique device identifier. That the constant evolution of QSight data is shared among all users benefits everyone.

Distribution of Device Identifiers in QSight®

	2019	2020	2021
Total Number of Products	562,866	597,383	604,959
GTIN	63%	69%	74%
HIBC	6%	21%	22%
Other	31%	11%	4%

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> **Kevin Capatch**
> Director of Process Engineering, Geisinger

"That's where we're starting to see some gains in using systems that are built on GS1 standards," Mr Capatch says. "We can use standards to figure out what items we all have in common."

The expansiveness of GS1 standards provides a means of capturing specialised attributes that are crucial in tissue and bone implant procedures. A hip replacement appliance must include the side of the human body into which it is intended for use, for instance; tissue grafts may require information taken from a visual inspection or preparation of the biological material. The need for greater specificity to populate medical practice records as well as individual medical histories is satisfied using standards-based inventory management.

From dock to doc

The enterprise resource planning (ERP) system that purchases products is primarily quantity-based. ERP confirms receipt of a carton of 12 stents, for example, but does not note the 12 individual serial numbers or differing expiration dates. By making the connection via QSight between the quantity received and the enriched data connected to those products, visibility and inventory integrity is achieved.

For example, in the cath area, the receiving dock creates a delivery ticket using ERP data; QSight matches the ERP data to the requesting specialty inventory analysts in the cardiac catheterisation lab expecting delivery of the stents. Each stent is scanned individually – each with its own serial number along with its lot number and expiration date. From that moment on, Geisinger has visibility into each stent until it is used on a patient, is expired, or is returned to inventory because it was ordered in a case but a larger stent was needed during the medical procedure.

A scan of the barcode will have captured everything about that stent and Geisinger's inventory will reflect every step in the lifecycle of that product. ERP uses the incoming shipment's GTINs to match the source to the order placed. The cath lab personnel capture critical attrib-

utes – size, expiration data, lot/batch number – in addition to the unique identifier to link back to the manufacturer in the event of a recall. And nurses who scan the individual stent's barcode in the procedure room allow the metadata to automatically populate the electronic medical record (EMR) and an individual's electronic health record (EHR).

Although the industry continues to advance in standards adoption, exceptions still arise, so support of master data management by allowing for the recognition of products that are new to Geisinger is crucial. Product procurement can bypass ERP systems entirely, for instance. Stents from a new supplier might be ordered directly by the specialty department needing them (ie. the cath lab). When the stents arrive at the point-of-care, the lab technicians scan the GS1 barcodes for supporting data for the devices, effectively introducing them into the master data system and placing them in the inventory management system.

Not only will the stents automatically be recognised at every subsequent juncture when scanned within the hospital, the data is automatically available within QSight. Its cloud-based model of data distribution then makes the data available to all customers simultaneously, consistently linking the same unique identifier or GTIN encoded in the barcode to the product.

"When a barcode scan matches, almost everything else happens effortlessly," Mr Capatch says. "You don't have people looking at descriptions, and other identifies on the packaging, you know the product is in your catalogue, and can become trackable in inventory."

The proof is in the inputting

Data quality is imperative for optimal Geisinger has successfully integrated inventory management fully into all non-OR procedural areas – including the catheterisation (cath labs), electrophysiology, and interventional radiology labs.

"The cath lab was first, but we didn't have to do a lot of convincing after the first implementation: 'That's so much better than my paper-and-pencil grocery list inventory system!' and 'I don't have to worry about expirations anymore because the system tells me you're 90 days out on this item' were common reactions from other departmental areas within Geisinger," says Mr Capatch. "Departments lined up. It was virtually self-marketing for the next installation."

While the three initial practice areas are using QSight for all product tracking, inventory management, and data governance, Geisinger is now concentrating on bringing the operating rooms managing tissue and implants into full utilisation.

"ORs are a little bit more challenging. You're getting into a world where the identifier may have been on the packaging of the non-sterile item, and that identifier gets removed when it's put into the sterilising case. So we are figuring out how we're going to capture data on things like non-sterile implants," Mr Capatch says.

He adds: "Without end-to-end inventory management, a nurse in the OR might have to employ multiple tools to scan multiple implants, which is not just bothersome, it's potentially dangerous. And without standards, none of the automatic identification of products is possible."

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Conclusion

Enabled by standards-based master data and the advanced data analytics available in QSight, Geisinger can drill-up to gain supply chain insights or drill-down to the case level to get the information the healthcare system needs, aggregated in the way it chooses.

Geisinger's extensive inventory management efforts provide the underpinning for a system-wide recall process. The system's assimilation of GS1 standards facilitates visibility – not just into individual products in inventory but into the network's entire operations by supplying reliable parallel comparisons. This is the kind of analytics needed to improve performance, which in the case of healthcare, can have profound consequences such as improved patient safety, expense management, and reimbursements. Standards open the door even wider: multiple hospitals can team up to conduct lifesaving research into health outcomes when apples-to-apples analyses are achieved through standards. These forward-thinking initiatives on Geisinger's roadmap will all be enabled by leveraging data made available by scanning the barcodes on medical devices.

About the authors

Kevin Capatch
Director of Process Engineering, Geisinger

As a director at Geisinger, Kevin uses Lean-Thinking to focus on magnifying the value and eliminating the waste in the core value streams. Kevin's evangelistic leadership style and manufacturing-based operational expertise, combined with his information systems background, has allowed him to stimulate new thinking and promotion of process redesign in Geisinger's supply chain information and care support delivery systems. He is a foundational leader with the Healthcare Transformation Group (HTG), the Community Advisory Board (CAB) for GS1 US Healthcare, and now serving on the Board of the newly formed Partnership for DSCSA Governance (PDG). He is active on multiple GS1, AHRMM, ASCx12, and C4SCS workgroups. He has completed AHRMM's Healthcare Supply Chain Leadership Institute and completed his master's degree in project management.

Vicky Lyle
Vice President, Industry Associations, Owens & Minor

Vicky Lyle is the vice president of industry associations at Owens & Minor, where she leads the company's involvement with industry and trade organisations worldwide. She currently serves on the executive board for Professional Women in Healthcare as the chair for the 2021 and 2022 term. She also serves on the board of Healthcare Supplier Diversity Alliance and serves on the Council of Supplier Diversity for Health Industry Distributors Association. Vicky has been with Owens & Minor for 35 years, contributing business and technical expertise across all facets of the supply chain.

Prior to her current role, she served as operating vice president service line strategy, a role in which she was responsible for the development of the inventory solutions platform along with service line operations, implementation and support.

In her time with the company, she has led several strategic cross-functional projects, including business acquisitions, distribution centre strategy, and the creation of Owens & Minor's Third Party Logistics (3PL) service offering.

Vicky holds a BA in business administration from Averett University, where she graduated Magna Cum Laude.

About the organisations

Geisinger Health is a healthcare system located in central Pennsylvania serving one million people. Founded more than 100 years ago by Abigail Geisinger, the system now includes 10 hospital campuses, a health plan with more than half a million members, a research institute and the Geisinger Commonwealth School of Medicine. With nearly 24,000 employees and more than 1,600 physicians on staff, Geisinger boosts its hometown economies in Pennsylvania by billions of dollars annually.

www.geisinger.org

Owens & Minor, Inc. (NYSE: OMI) is a Fortune 500 global healthcare solutions company integrating product manufacturing and delivery, home health supply, and perioperative services to support care through the hospital and into the home. Owens & Minor drives visibility, control and efficiency for patients, providers and healthcare professionals across the supply chain with proprietary technology and solutions, an extensive product portfolio, an Americas-based manufacturing footprint for personal protective equipment (PPE) and surgical products, as well as a robust portfolio of products and services for patients managing chronic and acute conditions in the home setting. Operating continuously since 1882 from its headquarters in Richmond, Virginia, Owens & Minor is a 140-year-old company powered by more than 20,000 global teammates.

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