

Greece

The impact of GS1 standards on operating room efficiency at the 401 Athens General Military Hospital

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| <p>Challenge Lack of standardisation for the hospital's inventory made it very difficult to have a clear view of operating room stock and the medical devices used during surgeries. Moreover, the hospital's Enterprise Resource Planning (ERP) did not allow accurate traceability of high-risk items such as implants.</p> <p>Approach Using GS1 standards, the hospital can now unambiguously identify inbound materials and medical devices used for each patient, not only in the OR but also in the Cardiac Catheterisation Laboratory and the Interventional Radiology Department.</p> | <p>L Expiration dates are checked automatically before devices are used</p> | <p>Using GS1 standards the hospital can now unambiguously identify inbound materials and medical devices used for each patient</p> |
| | <p>19h Savings in nurse time are more than 19 working hours per month</p> | <p>€ 21,000 net return on investment in 2018</p> |



In army supply chain processes, it's imperative to achieve fast and accurate operations. 401 Athens General Military Hospital, the largest army hospital in Greece, wanted to provide its patients with the same level of operational efficiency. Lack of a standardised coding and naming scheme for the hospital's inventory made it very difficult to have a clear and precise view of operating room (OR) stock and the medical devices used during surgeries.

Moreover, the hospital's Enterprise Resource Planning (ERP) did not allow accurate traceability of high-risk items such as implants. Manual registration of medical devices in the hospital's Electronic Patient Records was time-consuming and in many cases error prone. Using GS1 standards, the hospital can now unambiguously identify inbound materials and medical devices used for each patient, not only in the OR but also in the Cardiac Catheterisation Laboratory and the Interventional Radiology Department. This implementation has already offered faster item registration in the OR, improved traceability and remarkable stock effectiveness. GS1 standards are invaluable to the hospital's internal supply chain and they have already created a pipeline of future projects that will offer a better, more efficient caregiving experience for its patients.

The Athens General Military Hospital was founded in 1904 (renamed as "401 Athens General Military Hospital" in 1970) and is the largest of all the Hellenic Army's hospitals. It is also one of the largest healthcare institutions in Greece. Apart from its historical importance, the hospital is a base for scientific knowledge with engagement in research and training educational activities. It is this institution that trains Hellenic Army doctors and nurses (who are considered as high-level professionals in the Greek healthcare industry) and civil doctors who have been accredited by the Hellenic Ministry of Health. Moreover, it performs clinical and laboratory research projects and maintains a great medical scientific library. The hospital is also a member of the web community named "IMIHO - Interconnection of Military Hospitals" which has as its core purpose medical information exchange among South Eastern Europe military hospitals that specialise in challenging military and humanitarian activity.

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Poor data accuracy, unreliable processes

In such a demanding healthcare environment, the problems that were arising from having a non-standardised medical device coding and naming scheme were multiple.

First, there was not an accurate view of the OR's stock. Before the implementation of GS1 standards, there was no clear monitoring of what had been used on each patient during surgery, as well as on-the-shelf stock levels. This was a clear threat to the adequacy of management of everything needed for operations. Enquires from medical staff prompted a thorough but time-consuming search and the answers were sometimes inaccurate.

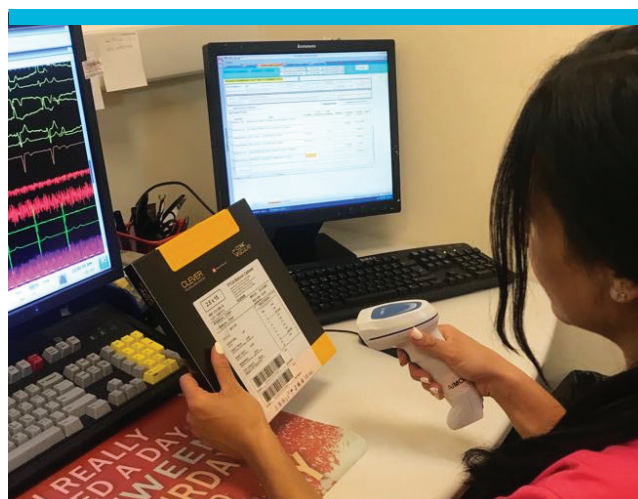
Moreover, the hospital's ERP did not support the recording of crucial item quality information such as batch/lot numbers, serial numbers, and expiration dates. The absence of this information made it difficult to locate items near their expiration date, or recalled or expired items. It also made it hard to plan an effective budgeting and procurement strategy.

Furthermore, recording of items used in surgeries was administered manually. Before GS1 standards, nurses in the OR were searching for item information (usually by reference number) in catalogues (spreadsheets) with a high risk of mistakes during the process. They first had to locate the item reference number and then manually register it in the hospital's ERP system. Expiration dates and other data for each item, were briefly cross-checked by the personnel and marked, if required, in paper documents for internal circulation. This practice included high-risk items such as implants, stents, and pacemakers, etc. Also, the nursing staff had to dedicate even more time to rechecking the records afterwards and, most of the time, items (such as surgical sutures and other general use items) that had been used in operations were not recorded at all.

Therefore, stock and surgery cost information wasn't reliable. The whole process was extremely time-consuming, resulting in a defective, bureaucratic process for hospital staff. In addition to these challenges, and most importantly, staff couldn't focus completely on their main duty - patient care.

The demand was clear. Reliable, accurate data needed to be captured, registered in the system and used for tracking and tracing high-risk materials. This required a major upgrade in hospital processes, focused on automation. The most difficult part was the engagement of staff in the ultimate vision: implementing GS1 standards and using them as a reliable, trusted tool in their daily routine.

The hospital, based on the previous and successful Hellenic Army Medical Supplies Centre GS1 standards implementation project ([GS1 Healthcare Reference Book 2016-2017](#)), decided that they could successfully adapt to this challenge by upgrading the hospital's internal system to use GS1 standards.



A new era of automated, secured and reliable data begins

The first step was easily decided upon. There should be unique identification and highly accurate automated data capture of invasive, high risk and high cost materials (specifically medical devices) used in the OR, the Catheterisation Laboratory and the Interventional Radiology Department.

Beginning in September 2017, the project started as a pilot for certain operating rooms and classes of items. It officially ended on October 2018 but continues as an ongoing project, aiming to include all operating rooms and all categories of medical devices. Full implementation in the Catheterisation Lab started in January 2018 and in August 2018 for the Interventional Radiology Department.

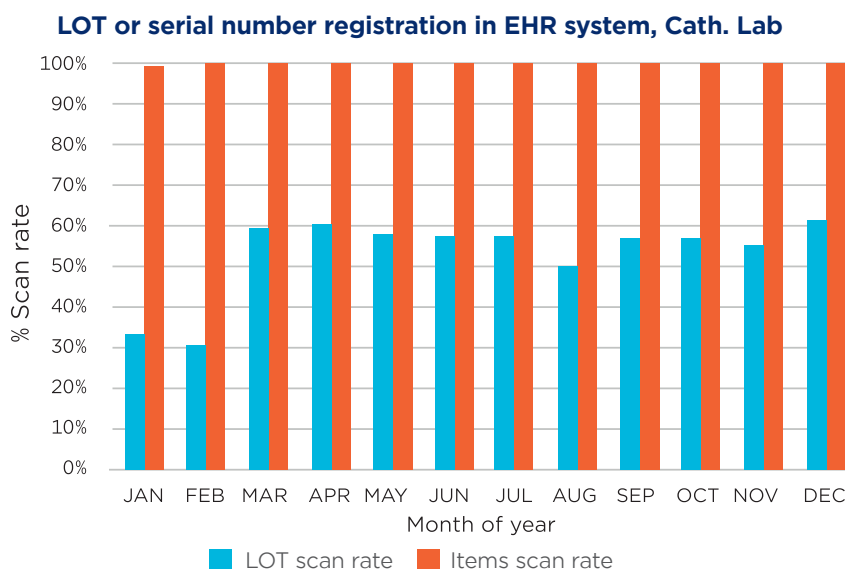
The hospital decided to use several components from the GS1 standards family. Firstly, the GTIN offers unambiguous and transparent identification for primary and secondary packaging of trade items received from suppliers. Then, in terms of automatic identification and data capture processes, the hospital's system registers data primarily through scanning GS1 barcodes like GS1 DataMatrix, GS1-128, EAN-13 without being limited to only these GS1 barcode symbols. GTINs and barcode scanning have been implemented for item identification for all inventory movements and the registration of medical devices into patient records. GS1 Application Identifiers are a vital tool for registering important quality information like batch/lot, expiry, serial etc. By using GS1 standards, the hospital utilises the interoperability already available in most of the registered items from their local and international suppliers. In terms of ensuring conformance with the new processes, the hospital provided clear notification to suppliers about these new specifications and immediately received a positive response which is ongoing and very encouraging.

Capitalising on the benefits of a global system of standards

The GS1 system of standards has, from the initial project implementation, proven its potential. During its implementation journey, the hospital has, for the first time, seen unprecedented business benefits both tangible and intangible.

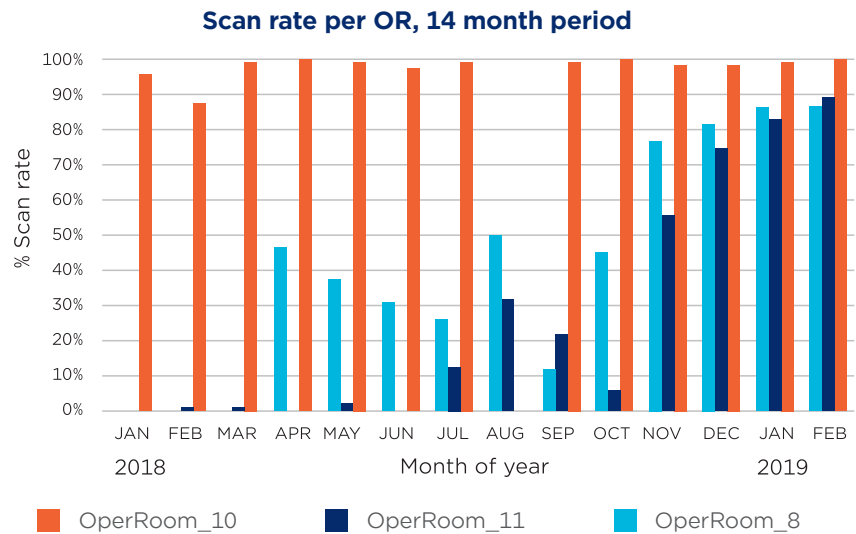
1. Enhanced patient safety: expiration dates are checked automatically before medical devices are used in the OR, thus alerting nurses to expired items. Also, through GS1 barcodes and GS1 Application Identifiers, accurate product identification plus registration of batch/lot numbers and serial numbers in patient records is available, as well as the easy recall of implants if needed. During the implementation in 2018, at the Catheterisation Laboratory, more than 570 different GTINs were associated to 732 medical procedures. Moreover, 165 serial numbers of high-risk medical devices were registered to 165 patients. Finally, more than 55% of high-risk medical devices, such as stents and pacemakers, were registered with their lot/batch information during every operation at the Catheterisation Laboratory.

In the following figure, the consistent rate of registering batch/lot (or serial numbers) in the Catheterisation Laboratory throughout the year is visible:





In the ORs, there has been continuous improvement in the scan rate of registered items. Below is the scan rate for the three active operating rooms:



2. More efficient and reliable supply chain procedures: the hospital's departments can now manage their stock more easily, as well as tracking consignment items.
3. Reliable information for strategic supply planning: accurate consumption data, produced in the Catheterisation Lab during 2018, made it possible for the finance department to form a specific supply strategy for the 2019 fiscal year.
4. Significant gains in the time needed for certain procedures: times for routine procedures have vastly improved through GS1 standards deployment. At the Catheterisation Lab, the time needed for stock counting is now more than 85% less than the time needed for doing the same job manually (plus it is now 100% accurate). In the Anesthesia Department, the time needed to register anesthesia sets for a patient is 80% less through barcoding than manually entering item codes using the hospital's software. It is calculated that savings in nurse time are more than 19 working hours per month.
5. Nursing staff engagement: perhaps the most important success factor of the project is the great interest from nursing staff in the new way of working. Medical and nursing staff have shown a very positive attitude towards the use of GS1 barcodes. Even though the pilot project started in the OR, it quickly moved successfully to other departments (e.g. the Catheterisation Lab) because of the interest and engagement of the nurses. GS1 standards have literally transformed the way the hospital's personnel work.
6. Return on investment: the initial capital investment of around 10,000 euros was used for hardware purchase only and not for software development as this was implemented in-house. Nevertheless, the amount spent has been recouped in a year and it was calculated that there was a net return on investment of around 21,000 euros in the fiscal year of 2018 from items that were returned to suppliers and replaced due to short expiry dates.

GS1 global standards are the future of Hellenic Army's hospitals

GS1 standards implementation now has a proven record of success, with significant operational and financial impact in the 401 Athens General Military Hospital. It has therefore become an ongoing project that steadily develops through the hospital's different departments. The management has decided that GS1 standards will lead the hospital's process automation vision, and the future includes:

1. Stock management of items in consignment (mostly orthopedic implants such as plates, screws etc.) during Q1 of 2019.
2. Implementation of specialised software for the traceability of cytostatic medicines (preparation in the laboratory and administration to the patient using bed-side scanning). The project is scheduled in two distinct phases: the first includes Cytostatic Lab software implementation, based on GS1 standards, during Q1 of 2019. The second phase includes bedside scanning for treated patients and is planned for Q2 of 2019.
3. Pilot installation of an SLS (Safety Labeling System) for high-risk anesthesia drugs used in the OR, planned for Q1 of 2019.

4. Copying the current success story, implementation of GS1 standards in the Catheterisation Laboratory and Operating Rooms at the second largest Army Hospital in Thessaloniki.
5. Patient identification using wristbands on which the patient data are presented both in human-readable format and in a GS1 DataMatrix. The specific project implementation is scheduled for Q1 2019 and is considered a top priority by the hospital's management.

The impact of adopting a global system of standards has led to improved patient safety, and interoperability internally within departments and externally with suppliers. Fast and accurate data capture, and full tracking and traceability of high risk and upscale materials, is a strategic priority for Greece's largest military hospital, particularly now that the healthcare spending in general has severely been affected by budget cuts. The estimated tangible and intangible business benefits from the adoption of this system are vital.

About the author



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Sotirios Tsiafos-Tsiaras is a military pharmacist with more than 20 years of experience in the healthcare supply chain. He is the person leading the implementation of GS1 standards in the Greek Army's Healthcare sector. He has been a logistics manager at the Greek Army Medical Supplies Centre and is credited with the design and implementation of the Centre's WMS based on the GS1 system. Currently he is the OR traceability project manager at 401 Athens General Military Hospital, where GS1 standards are utilized for tracking medical devices and materials used in the Operating Rooms, in the Cardiac Catheterisation Lab and the Interventional Radiology Department. Mr Tsiafos-Tsiaras holds a Bachelor of Science in Pharmacy and a Master of Science in Logistics and Supply Chain Management. He also holds a Diploma in Information Systems Management and Database Programming.



About the organisation



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