

# Chinese Taipei

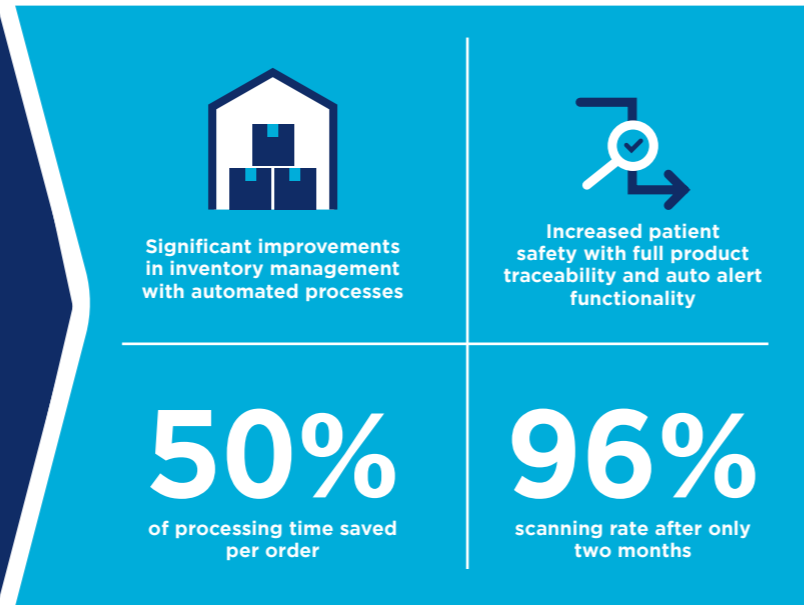
## St. Joseph's Hospital: Unique Device Identification for better care and patient safety

### Challenge

Like many hospitals in Chinese Taipei, St. Joseph's Hospital once used paper records, manual processes and no specific methodology to manage its medical devices and materials.

### Approach

St. Joseph's Hospital launched a Unique Device Identification (UDI) project that automated its business and clinical processes by implementing GS1 standards to uniquely identify all medical devices and materials. With this foundation, the hospital was able to establish a traceability system for implanted medical devices and collect real-time data about their use and associated inventory levels.



### Transforming information management

Early in 2018, St. Joseph's Hospital started its UDI project after visiting the Kaohsiung Armed Forces General Hospital (See case study in GS1 Healthcare Reference Book 2019-2020, page 12.), well-known for its effective and efficient management of medical devices and materials after implementing unique device identification with GS1 standards.

St. Joseph's major goal was to achieve visibility and traceability of product information throughout its whole supply chain. However, its staff and nurses were accustomed to processing records and documents, using manual and paper-intensive procedures. Due to inconsistent product information, this often meant redundant, cross-checking work activities and issues in operations. Furthermore, the lack of disciplined resource management caused waste and unnecessary costs.

As a private regional hospital, St. Joseph's Hospital is faced with many challenges to maintain its mission of quality care and charitable spirit. Throughout 2019, the hospital staff worked with Triple A MedTech Co. Ltd. and GS1 Chinese Taipei, to ensure a successful UDI implementation for improved inventory and information management.

With this transformation, St. Joseph's Hospital aims to:

- Enhance its control of processes and information management via the implementation of the unique device identification of medical devices and materials, reducing opportunities for human error and increasing patient safety.
- Improve inventory management for medical devices and materials.
- Establish traceability for implanted medical devices used in patients.
- Integrate all existing systems used by each of its departments, so that consistent information can be shared.



**In 2019, the hospital received the international certification of ISO 9001: 2015. The introduction of GS1 standards for UDI implementation and the smart management solution were two important indicators in the evaluation of hospital management's integrity and quality. This ongoing project will facilitate information security and reform process management, but will also pave the way to the ultimate goal of effectively controlling hospital operating costs.**



St. Joseph's (Catholic) Hospital is located in Huwei township, Yunlin county, Chinese Taipei. It was established by Bishop Thomas Niu

of the Chiayi diocese in 1955, and two young and energetic missionaries, Fr. George Massin from Belgium and Fr. Anthony Pierrot from the Netherlands, who became the first administrators of the hospital. Today, the hospital's mission is to provide comprehensive medical services to the residents—especially the poor—of Huwei and its neighbouring towns.

For many years, church-affiliated hospitals "filled the healthcare gap" by providing services to the poor who couldn't afford medical care. Today, even with Chinese Taipei's policy of national healthcare insurance, St. Joseph's Hospital remains focused on serving the needs of society. Driven by the values of "Total Sacrifice, True Love and Constant Joy," St. Joseph's Hospital offers quality medical care to all patients. Its outpatient treatment services cover 18 clinical specialties and sub-specialties, including internal medicine, surgical and other clinical departments. On average, St. Joseph's Hospital receives more than 1,300 outpatients per day.



**With 700 caregivers and staff, and 378 beds, St. Joseph's Hospital is committed to the needs of all people of Huwei and surrounding areas.**

Su-Chen Lin, Cai-Cing Liao, Shu-Hui Wang & Kingsley Huang

### Overcoming problems

Many problems occurring in Chinese Taipei's hospitals are often caused by using manual procedures when maintaining product information. This inefficient management of data results in issues like:

- Reduced visibility throughout communications that impacts traceability
- Human errors and inefficient processes due to a lack of complete product information
- Redundant activities for staff
- Uninformed decision-making caused by unavailable real-time information
- No real-time alerts about suspicious products or other anomalies
- Poor communication among different departments caused by lack of consistent product information

Especially in operating rooms, there is a large number of medical items used with many different specifications and types of packages of the same items. Consignment sales for non-stocked, spare parts also makes control more difficult. High-risk medical devices with high unit prices often cause high costs for the hospital if the actual quantity of devices used is not recorded correctly and matched to suppliers' lists.

Another serious situation that St. Joseph's Hospital faces is the decline of surgical patients over the years. In response, the hospital must reinforce its strength as a hospital that offers specialised services, which helps to reduce costs and increase revenue.



### An integrated solution supported by GS1 standards

All these challenges are related to the lack of data transparency. The solution must increase data visibility and enable the use of UDI data throughout the hospital's entire network of databases. To do this, UDI data must be captured efficiently and accurately by all systems—for their individual use, for purposes requiring interoperability and for updating electronic patient records.

St. Joseph's invested significant time, persistent effort and unwavering passion, working together with GS1 Chinese Taipei. Following are some of the key success factors:

- Support from the hospital's executive management team played an important role in facilitating the coordination and communication among different staff members and departments. It ensured that all personnel were involved and cooperated together for the same goal, when executing the plan.
- The hospital secured support from a third-party solution provider and assistance from GS1 Chinese Taipei to understand the feasibility and benefits of UDI implementation using GS1 standards.
- The team created awareness, engagement and commitment regarding the UDI concept in departments where implementations were taking place. This included delivering

training, creating a staff working group and providing ways for staff to suggest improvements.

- Workshops and seminars were sponsored for the suppliers of medical materials and devices. The hospital explained the reasons for adopting UDI using GS1 standards, and especially the benefits such as access to accurate, real-time product data from the hospital's inventory management system.
- The implementation of the Smart Management Cloud solution, developed by Triple A MedTech Co. Ltd., was essential for the project since it provided the core of the hospital's information network system.

St. Joseph's Hospital has been working with Triple A MedTech Co. Ltd. to deliver the cloud solution enabled by UDI and GS1 standards. This includes the use of artificial intelligence (AI) with patented algorithm and machine/deep learning, to enhance cloud computing capabilities for UDI in clinical medical environments.

The solution allows St. Joseph's to automatically complete the synchronisation of data feeding services, including the clinical medical information system, supply chain management system, hospital management and logistics system.

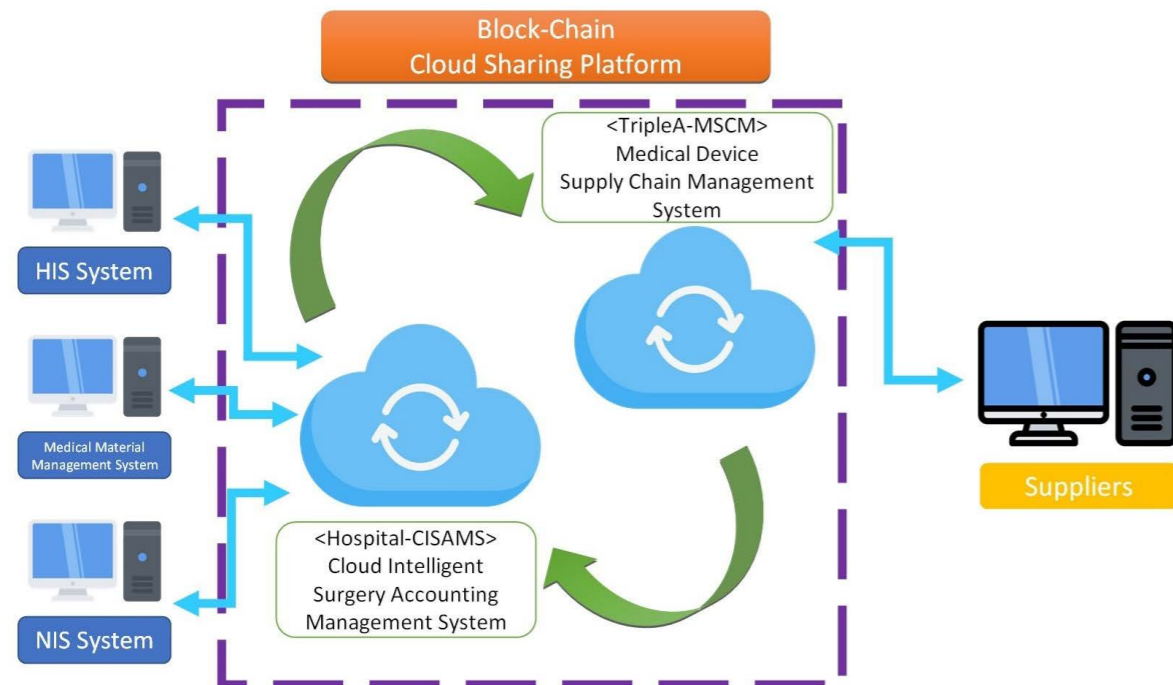


Figure 1: The Cloud Integrative Network of Hospital Information Systems

### Tangible benefits and recognition

With the assistance of automatic identification at the front-end of the new service chain, problems associated with manual operations have been overcome by the smart management of information solution. This has elevated the quality of medical device management to a new level. St. Joseph's Hospital won the High Distinction Award of the "2018 Healthcare Quality Improvement Campaign in Chinese Taipei." In 2019, the entire hospital passed the international certification of ISO 9001: 2015.

Quantitative indicators include:

- The quantity of scanned items has grown from 87 to 4314, an increase of nearly 50 times.
- Efficient inventory management has resulted from the improved accuracy of real-time records of 96%. Also, e-statement reports have simplified the reconciliation process with suppliers, saving considerable processing time of hospital purchase orders for medical devices and materials.



Figure 2: In the preparation room, product items are all well arranged, especially for those bulk materials in the first-class category. They are easily identified by the staff scanning the card with the UDI barcode attached on the drawer. In the left photo, the quantity of products' usage over time can be recorded in the information system.



Figure 3: Preparing needed items before a surgery has become easier and faster when using the wireless portable reader to scan items' barcodes. The information system facilitates product data visibility in many processes, increasing administrative efficiency and patient safety. Now, St. Joseph's Hospital has achieved product traceability via effective product management based on GS1 standards for unique device identification.

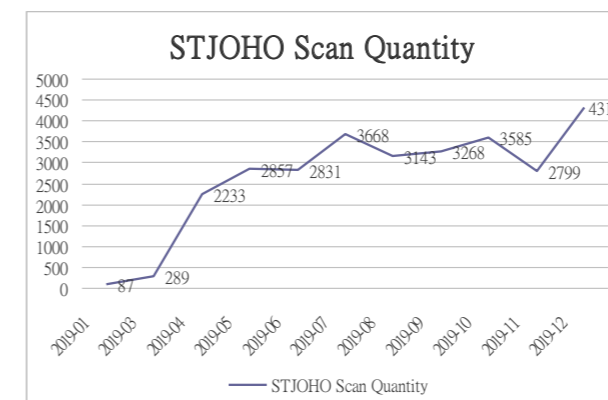


Figure 4: In 2019, the quantity of scanned items per month increased from 87 to 4314, nearly 50 times more scans.



Figure 5: St. Joseph's Hospital thanks its UDI project team that worked tirelessly to make UDI and traceability a reality.

## Every stakeholder benefits

By automating processes with the UDI implementation, healthcare professionals are now saving a significant amount of time that they can now spend on patient care. Using GS1 standards and simple scans to identify products, visibility of accurate product

information and traceability of medical devices are now possible, enhancing quality of care and patient safety. In short, all stakeholders in the healthcare supply chain are benefiting from the St. Joseph's UDI implementation.

## Next steps

St. Joseph's Hospital is planning additional projects for continuous improvements within the hospital and for patient safety.

## Smart box for surgical kits

Many medical devices must be unpacked for sterilisation in advance of surgeries. In order to automatically identify these kits for data capture, the application of a smart box for each surgical kit will be adopted. Before sterilisation, the product information is first stored in the smart box by scanning the UDI encoded in a barcode on the label of the package. When a specific smart box is scanned in the operating room, the virtual box is matched to the physical one that will show on the screen, which displays the inside tools. The nurse touches the virtual items on the screen, then the pre-stored product info will be automatically input into the record of usage.

## Electronic invoice for medical device suppliers

St. Joseph's Hospital not only applies UDI to clinical medical records, it also integrates the supplier's accounting information in the 2020 plan. When the medical materials provided by the supplier are used, the system will generate a unique reconciliation corresponding to the UDI used. This record will become the only information for invoicing between the hospital and suppliers. St. Joseph's Hospital will also introduce an electronic invoice exchange system, with the key for verification being the UDI.

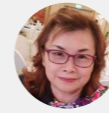
## Further integration of existing systems

For visibility and traceability among information systems, St. Joseph's next phase will use UDI as the sole identifier to integrate the hospital's clinical and administrative management. Not only can it be used in clinical e-records, accounting aggregation, medical device and material management, the UDI can also provide alerts of defective products.

UDI will continue to play a critical role in St. Joseph's Hospital. A core strategy of St. Joseph's Hospital management is to always be compliant with GS1 standards. The hospital is pushing forward with the concept of UDI-driven administration and management from the surgery operating rooms to all existing information systems for relevant departments and divisions. UDI will help St. Joseph's Hospital to efficiently control the inventory of medical devices and materials, effectively manage their suppliers and source channels, and accurately accelerate purchasing, pricing and financial processes.

With the implementation of GS1 standards and UDI, this transformation will lead to smart hospital management for high-quality healthcare services, not only solving challenges for St. Joseph's Hospital, but also delivering a promising future for innovative, quality care and patient safety.

## About the authors



**Su-Chen Lin, PhD**  
Vice President of  
Administration  
St. Joseph's Hospital

Su-Chen Lin has a doctorate in Industrial Engineering and Management, specialising in artificial intelligence and decision-making analysis. Dr. Lin is in charge of administration management at the hospital. She is also the CEO of the Catholic St. Joseph's Social Welfare Foundation, investing significant effort and time to care for elders in remote areas of Yunlin County.



**Cai-Cing Liao**  
Head Nurse of Operating  
Room  
St. Joseph's Hospital

Cai-Cing Liao is currently Head Nurse of Operating Rooms of St. Joseph's Hospital. She has been responsible for the UDI project execution and encourages her team members to cooperate with other departments to achieve the best results.



**Shu-Hui Wang**  
Project Head Nurse  
UDI Project Manager  
St. Joseph's Hospital

Project Head Nurse Shu-Hui Wang is currently the UDI Project Managing Nurse of Operating Rooms of St. Joseph's Hospital. Since 2018, she has been responsible for the initiation of the in-house UDI project, including planning, monitoring and controlling. She is one of the pioneers who introduced UDI technology in the hospital.



**Kingsley Huang, PhD**  
Founder and CEO  
Triple A MedTech Co., Ltd.

Kingsley Huang is the founder and CEO of Triple A MedTech Co., Ltd., which helps to integrate clinical systems with UDI concepts, using innovative solutions to medical merchandise management.

## About the organisations

**St. Joseph's Hospital** is located in Huwei township in Chinese Taipei. Established in 1955 by Bishop Thomas Niu and two missionaries, the hospital has 378 beds with approximately 700 caregivers and staff. The hospital's mission is to provide comprehensive medical services to the residents of Huwei, especially the poor.

[www.stjoho.org.tw](http://www.stjoho.org.tw)

**Triple A MedTech Co., Ltd.** is a young, start-up company with research strengths and worldwide ambitions aimed to provide IoT, blockchain and cloud technologies as a smart solution to empower the outstanding medical services in major medical institutions. Its GS1 standards and UDI-oriented cloud solution offers over 30 hospitals in Chinese Taipei a wide range of clinical services and tracking and clinical assistant diagnosis tools to clinicians and healthcare providers.

[www.triplea-medtech.com](http://www.triplea-medtech.com)