





## Ireland

# Best practice patient safety and traceability of infant feeds at CHI (Children’s Health Ireland) at Temple Street

<p><b>Challenge</b> In 2016 the hospital was audited by the Food Safety Professionals Association (FSPA). One of the findings of the audit was that the hospital was unable to track feeds to patients.</p> <p><b>Approach</b> The hospital implemented a standards-based traceability database, barcode labelling and a scanning system that could capture the critical data about each product (expiry date or best before date, batch number, location within the hospital e.g. store or ward, the staff member that delivered or prepared the feed and ultimately the patient that received it).</p>	 <p><b>Patient safety benefits from the additional controls and full traceability of feeds</b></p>	 <p><b>Estimated time savings equate to 0.5 full time staff per week</b></p>
	 <p><b>Reports/audits at the touch of a button</b></p>	 <p><b>Electronic batch recall now possible (from hours to seconds)</b></p>



The Special Feeds Unit (SFU) at CHI at Temple Street looks after the storing, preparation and delivery of prescribed feeds to infants with special dietary needs. In 2016 the hospital was audited by the Food Safety Professionals Association (FSPA). One of the findings of the audit was that there was a necessity to track feeds to the patient in the hospital for the purposes of patient safety and in case of product recall. It was agreed, as a matter of urgency, that a modern, time-efficient computerised traceability system based on standards was required by the unit.

Sinead Moran

## Background

CHI at Temple Street is a 135 bed children’s hospital in Dublin. The hospital cares for all types of patients and some require very specific care, such as metabolic patients. These patients need their weight, blood sugar and cholesterol levels monitored carefully to ensure better quality of life and to reduce the risk of a heart attack or stroke. It is vitally important that these patients receive the correct feeds. As a result, the Special Feeds Unit prepares and dispatches up to 400 patient feeds per day. The Special Feeds Unit also hold emergency feeds in a freezer for such patients, even when they are not an in-patient in the hospital, and these feeds must be checked and counted every day.

## The challenge: product recall

Following an audit conducted by the FSPA in 2016 it was recommended that the hospital implement an electronic traceability system for special feeds. The previous process was paper-based and time consuming. If the hospital received a recall notice from a supplier, they had to manually hunt through paper records from the last six months to identify what patients had received that batch as well as to locate the tins of product with that batch number so that no further product could be distributed. This information was often difficult to locate on the product and hard to read. Additionally, staff had to find all the recalled product within the hospital and there were no physical controls in place to automatically ensure that recalled product was not subsequently issued to patients.

## Project objectives

The purpose of the new electronic traceability system was to ensure complete, real-time visibility of each special feed across the hospital; in stores; in the feed preparation area; on the ward, right to the patient. The critical information for traceability and recall purposes includes product name, product barcode/GTIN, best before or expiry date, batch number and patient ID. Instant access to this information provides full visibility of stock at all times for patient safety, inventory and financial purposes, and fully complies with the legal requirements for food traceability and recall. To be effective the new system needed to be quick, efficient and accurate and not hinder the day-to-day work of healthcare staff in any way.

## Preparing the business case - going paperless to improve patient safety

The manager and staff of the SFU formed a cross-departmental team that included; the hospital facilities manager, Catering, Procurement and ICT. The SFU manager also attended regular meetings with the dieticians and nursing staff to ensure they were fully briefed and included in the process. The team worked together to define the flow of product from Goods In, through the SFU and to the patient in the ward. (Scanning at the patient bedside is planned for phase two). A system specification was drawn up outlining the needs for a standards-based traceability database, barcode labelling and a scanning system that could capture the critical data about each product (expiry date or best before date, batch number, location within the hospital e.g. store or ward, the staff member that delivered or prepared the feed and ultimately the patient that received it).

Following a tender process in early 2018 and consultations with three solution providers, the hospital began work with the standards organisation GS1 Ireland for the software, and the hospital's ICT team procured the necessary hardware.



Fig. 1 Feed preparation area with wall mounted touch screen PCs and Scanners displaying the GS1 scanning app

## The need for unique identifiers

Every member of staff, patient and ward within the hospital was assigned its own unique identifier. It was agreed that the hospital would follow industry best practice in assigning globally unique identifiers for the following purposes:



**Product identification (Global Trade Item Number (GS1 GTIN))** - products already had GTINs assigned to all levels of product packaging by the manufacturer and these are used throughout the traceability process.



**Location identification (Global Location Number (GS1 GLN))** - each location to which goods are dispatched or stored are assigned a GLN e.g. ward.



**Staff identification (Global Service Relation Number (GS1 GSRN))** - the staff number is embedded in a GS1 identifier.

**Patient identification** - the existing non-GS1 barcode is scanned today but this may change to a GS1 barcode in the future.

## System go live

Commencing April 2018, the new traceability software, GS1 scanning app was installed on PCs and wall-mounted tablets, together with barcode scanners, in key hospital locations; Goods In, SFU stores and in the feed preparation area. Phase one was completed in June 2018. Additional modules to manage the daily inventory count for the freezer feeds and heat-treated feeds were added in March 2019 and this further supported the objective of the SFU manager to achieve a fully paperless process.

## The barcode

While all the products being purchased by the hospital had a unique identifier (GTIN) encoded in a barcode it was discovered that this information was not held in the hospital's product file. Before the SFU team could start to label and track the products, they needed to import their product file and capture the GTINs. The GS1 scanning app has a "product setup module" which made it very easy to create the links between the product GTIN, the case GTIN and the existing product data held on file. This step is fundamental to the set-up of the scanning process as it means that when a barcode is scanned the system knows what product it is and whether it is a single unit or a case with multiple units. The data also offers great insight into the full range of products carried by the hospital, by type and supplier.

Scanning of this product barcode is used as a trigger to generate the GS1 serialised barcode applied to the individual cases of product at Goods Receiving. The purpose of adding this barcode is two-fold to add:

1. The information on the packaging in human readable form (such as the batch number and use by date or best before date) in a barcode to make it scannable.
2. A serial number to enable unique identification and tracking of each individual instance of the product.

The addition of the serial number is crucial to provide unique identification of each instance of a feed container, for the following reasons:

- When a container is opened, the expiry date is limited to one month from the date of opening, so each container must be tracked individually throughout the hospital processes.
- If individual items are deemed to be opened, damaged, or otherwise compromised, they can be flagged accordingly and the system can then prevent their subsequent use.
- To prevent double-counting or over-counting of stock inventory. Serialisation allows the system to 'link' individual instances of a product with individual patients.
- Serialisation also allows the system to record if an item which was 'linked' to an individual patient was not subsequently fed to that patient (i.e. if it is returned to stock).



All of the above information is encoded according to GS1 standards using GS1 Application Identifiers.

The work required to barcode label and serialise each product at Goods In replaced an existing manual activity to add the expiry date. This meant that while the new process initially added some time at Goods Receiving, ultimately there is a significant time and paper saving overall, as it has removed the need to manually record batch information on multiple records as products move throughout the hospital.



**Cherrylyn Panganiban**  
Healthcare assistant  
CHI (Children's Health  
Ireland) at Temple Street

The new system has proven its efficiency credentials. It now takes us less time to prepare feeds as the date and batch data does not need to be handwritten. There's less chance of making a mistake and it cuts down on our paper work."

### Common industry practices



NOTE: GTINs below for illustration only

Single Unit Package	Multiple Unit Package	Case
GTIN A	GTIN B	GTIN C
5391234560008	5391234560015	5391234560022

### The new process

#### Goods In

When products arrive from suppliers they are recorded, labelled and added to stock. This is done by scanning the outer case barcode (Fig. 2) which usually includes the key traceability information (product ID, expiry or best before date and batch number). Where this information is not available in a barcode it is manually entered into the system by SFU staff. Where information is entered manually, the system always requires it to be entered twice as a critical control point.

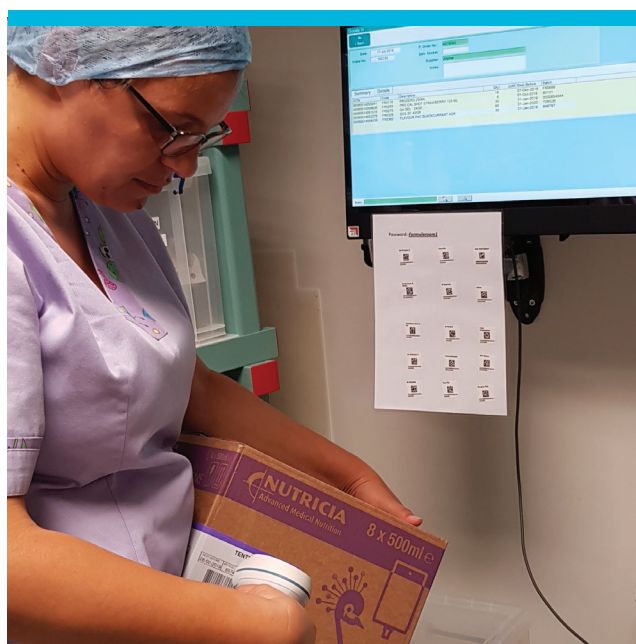


Fig. 2 The hospital staff scan the cases (GS1-128 barcode) of product at Goods In in the store room

The system then generates individual GS1 2D DataMatrix labels with a unique traceability serial number. These are added to each unit (e.g. bottle of liquid feed or tin of powdered formula) so that the traceability data is carried right throughout the hospital. From this point on all product movements are recorded 'as fast as a barcode can be scanned'.

**Bernadette O'Connor**  
Staff nurse  
CHI (Children's Health Ireland) at Temple Street

The new system provides us with full visibility of all product in stores, on the ward and dispensed to infants. In the event of a recall it is now possible for us, within a matter of minutes, to locate or account for each unit of the affected product."

**GS1 2D Datamatrix barcode**

Product ID (GTIN)(01)\*  
Best before date (15)\*  
Batch number (10)\*  
Serial number (21)\*

(x) = Application Identifier

\* Titles are abbreviated or missing due to label size being limited and not to obscure any text on original product label.

### Feed preparation

Some of the special feeds are prepared onsite in the feed preparation area (Fig. 1). The SFU staff prepare the feed according to the prescription from the dieticians. As they prepare the feed each item is scanned so that the contents of the prepared feed are recorded. In accordance with HACCP food safety requirements, the temperature of certain feeds at preparation is also recorded.

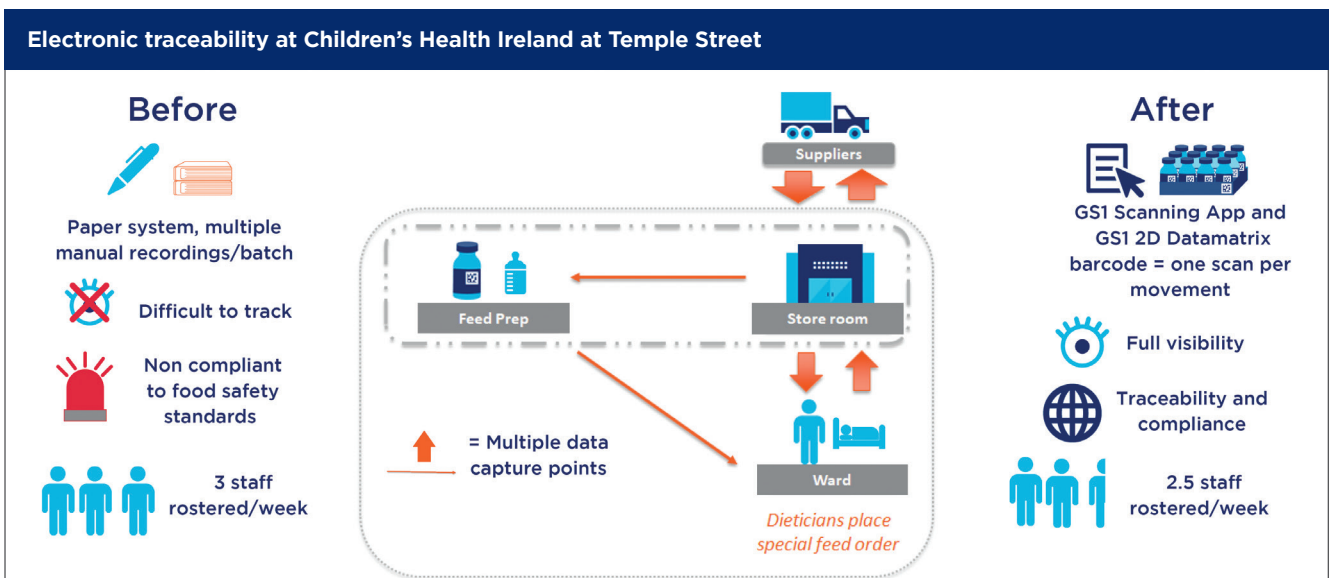
Additionally, when a container of powder is opened for the first time the expiry date or best before data applied by the supplier becomes invalid, and the new expiry date is a maximum of 30 days from the date of opening (Fig. 3). To facilitate this, the scanning app generates a new GS1 barcode, linked to the serial number applied to the container at the point of Goods In, with a new expiry of 30 days. This ensures the powder isn't used beyond the recommended date and is a fundamental patient safety check.

### Dispatch to the ward/patient

Special feed orders for patients are requested through the hospital's dietetics system by the dieticians and the SFU staff prepare the products for dispatch. Each product is scanned out of the special feeds unit and linked to the staff, patient and location it is going to e.g. ward. The four-way scanning of product, staff, patient and location, combined with date/time stamping, forms the foundation of the traceability process, recording the who, what, where and when of each dispensed feed.

### Returns to stores

Product is regularly returned from the ward when it has not been used by the patient. The return to stock of feeds and products dispensed to a ward but not consumed is also efficiently managed using the GS1 barcodes and has proven to be a great time saver in addition to providing full traceability.



## Outcomes and benefits

From the start of the project the team has seen the benefits of having an electronic system to manage a previously labour intensive, paper-based process. The success of the implementation was due in great part to the enthusiasm and commitment of the team (Fig. 4).

### Key benefits:

- Patient safety benefits from the additional controls and full traceability of the feeds.
- Electronic batch recall now possible (reduced from hours to seconds).
- The estimated time savings equate to half of a full-time member of staff every week.
- Significant paper savings.
- Staff engagement.
- Reports/audits at the touch of a button.
- Additional unanticipated benefits (e.g. HACCP forms and process improvements).
- Widespread interest both internally and from other hospitals.

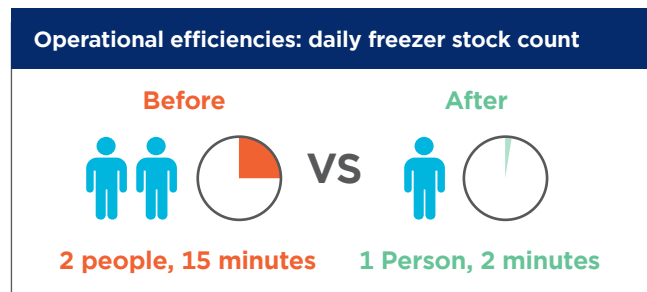
Furthermore, controls within the system based on the serialisation of the products prevent the dispensing or preparation of any expired or recalled product. The intelligence built into the system prompts staff to select short-dated products should they be available, helping to promote better stock rotation, reducing waste and saving the hospital money. The movement of all product is recorded against a ward or patient, ensuring that wasteful, buffer stocks are not built up in several areas around the hospital.

Beyond the initial project objectives, the introduction of the traceability system highlighted

where better practices could be implemented for stock rotation and management, reducing and often eliminating waste where previously product had been disposed of.

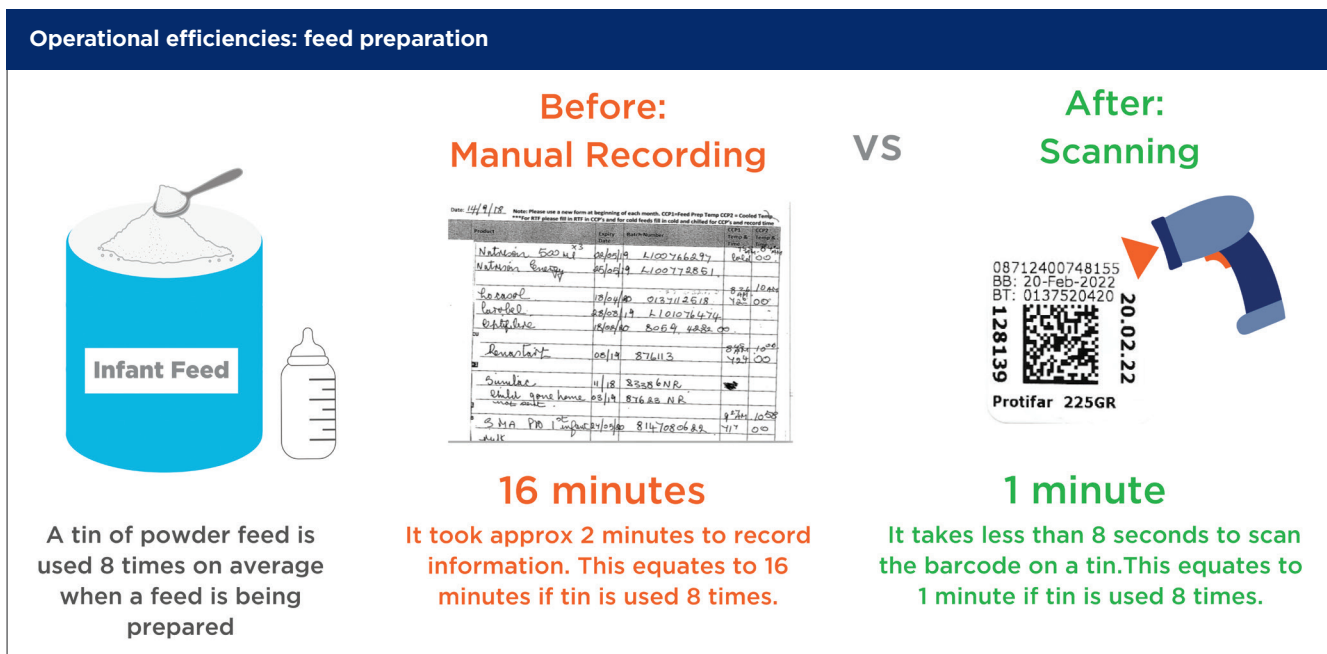
## Frozen and heat-treated feeds

The success of this first phase of implementation has prompted steps towards two further enhancements. Firstly, the labelling of prepared emergency freezer feeds with a GS1 barcode to facilitate the daily stock counts. This process previously took two people 15 minutes every day and can now be done by one person in less than two minutes per day. Secondly, the barcode of heat-treated feeds is used as the identifier against which a full audit trail of the temperature of the product at various stages of the process is recorded.



**Mona Baker**  
Chief Executive Officer  
CHI (Children's Health  
Ireland) at Temple Street

Our staff take great pride in delivering the best care for patients. We know where each feed is and a product recall can be done in seconds. This is an excellent example of innovation at CHI at Temple Street to improve patient safety.



## Next steps

The hospital sees this implementation as the first step in a broader traceability programme. Phase two for the SFU is to scan the feed at the patient bedside. In addition, the hospital is interested in electronic traceability for catering (patient meals), breast milk, hospital assets and the procurement of products.

CHI at Temple Street will be moving to the new children's hospital on the St James's Hospital campus in 2022, so the success of the traceability project in the SFU will be an important component for the move to the new location.

## About the author



**Sinead Moran**  
Special Feeds Unit Manager  
CHI (Children's Health Ireland) at Temple Street

Sinead Moran is Special Feeds Unit Manager in CHI at Temple Street.

Sinead has worked in CHI at Temple Street for three years. Prior to that Sinead worked in a number of hospitals in the area of CSSD (Central Sterile Services Department) including the Bon Secours Hospital group and the National Maternity Hospital. Sinead has a strong background in traceability having implemented electronic traceability of instrument sets in some of these hospitals and has 21 years' experience in total in the healthcare industry.



Fig. 3 Each item is scanned in the feed preparation area so the contents of the prepared feed are recorded



Fig. 4 L to R: Sinead Moran, Bernadette O'Connor, Timea Varga, Deirdre Kane, Vilma Slavinskiene, Cherrylyn Panganiban, Marian Draper, Ruth Ennis

## About the organisation



**CHI at Temple Street**, founded in 1872, is an acute paediatric hospital serving some of Ireland's sickest children and providing a referral and care service on a national basis. Seven major specialities at Temple Street today include neonatal and paediatric surgery, neurology, neurosurgery, nephrology, orthopaedics, ENT and plastic surgery. Temple Street cares for 145,000 children per year. Over 45,000 of these children attend the Emergency Department every year making it one of the busiest in Europe. A staff of 85 consultants and over 950 other full time and part time nursing, paramedical and other staff deliver care. [www.cuh.ie](http://www.cuh.ie)