Leveraging GS1 standards to ensure accuracy and safety of patient care at Canberra Hospital

To take full advantage of technologies available today, healthcare providers need to consider how they "capture" the identification of their patients and clinicians at the points of care. Supporting positive patient identification is especially important in busy clinical areas and where mis-identification could lead to adverse events. Using GS1 standards as the needed foundation, ACT Health and Canberra Hospital are identifying their patients and care providers for ensuring accuracy in patient-care processes throughout each patient's journey within their hospital. As a result, there has been more than a 40 percent reduction in wrong-blood-in-tube incidents based on clinicians scanning GS1 barcodes when collecting pathology samples.

By Ryan Mavin

Digitisation of healthcare

ACT Health provides healthcare services to an estimated 550,000 people in southeastern Australia. Like many parts of the world, the region's demographic is shifting towards an older profile of patients, with increased age-related, chronic conditions and heavier demand for health services. With the goal to achieve better outcomes for patients and increase patient safety, ACT Health is making significant investments in creating a digital healthcare infrastructure.

To do this, the healthcare system needed to develop a GS1 standards framework to support its digitisation of clinical processes across the ACT Health and Canberra Hospital campus. This also needed to be scalable for implementation at the new University of Canberra Hospital and Calvary Public Hospital Bruce.

Since its inception, ACT Health has worked to continuously improve its treatment of patients, identifying issues, establishing policies for prevention, and driving compliance of these policies. Yet, manual processes could only help so much. The health system found that as more and more patients needed services, there was always room for error.

"We were recognising incidents despite our efforts to implement policies to prevent them," says Ryan Mavin, Manager Enterprise Architecture Office, ACT Health. "Our wrong-blood-in-tube occurrences were above the national average. Based on an error-prone process when collecting pathology samples, there was an elevated risk of people getting the wrong treatments. Simply put: the situation was unacceptable."

Paper-based policies were not making a big enough difference. Rather, there was a need to harness the power of technology to create standardised, automated processes to support error-free patient care.

Engaging with GS1 Australia, the ACT Health team established the Location Based Services Steering Committee in 2013 and set off on its multi-year journey to transform patient care processes—starting specifically with the collection of pathology samples.

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Positive patient identification

"We needed to implement a more robust method to ensure the identification of patients and caregivers within the collection process to enable 'positive patient identification' (PPID) that is in line with the National Standard for patient identification and procedure matching," explains Mavin. "In addition, this method needed to be able to support other patient care interactions where PPID was required."

GS1 Australia helped the team to better understand how GS1 standards could help support the solution that was needed across the organisation. "GS1 introduced us to the ISO Technical Standard 18530:2014, which provided detailed workflows to assist us regarding pathology samples," says Mavin.

The ISO technical specification articulates how GS1 identifiers, specifically the Global Service Relation Number (GSRN), and Service Relation Instance Number (SRIN) can be used for patient identification and for care providers. The document then illustrates how these can be applied along with several other international standards to support good practices within a series of 30 use cases.

Creating the standards framework

The first step taken by the team was to implement GS1 identifiers as the building blocks for the PPID solution. ACT Health initially implemented GS1 identifiers with minimal integration and then built value through integrating the standards with its systems.

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The team needed to ensure that positive patient identification could only occur at the bedside by scanning the patient's wristband. To achieve this, the patient wristband's GSRN and SRIN identifier was electronically distinct from any other forms of patient identification such as the GSRN and SRIN identifier on the clinical notes labels.

"The GS1 publication of ISO Technical Standard 18530:2014 solved this problem with the use of the GSRN and SRIN," says Mavin. "The subsequent expansion of the specification to support staff/caregiver identification with the SRIN was also very useful."

- **Patient ID**: Global Service Relation Number (GSRN) + Service Relation Instance Number (SRIN)
  – Wristband
  – Clinical notes labels
  – Specimen labels
- **Staff ID cards**: GSRN
- **Location ID:** Global Location Number (GLN)
- **Product ID:** Serialised Global Trade Item Number (SGTIN)
- **Asset ID:** Global Returnable Asset Identifier (GRAI) or Global Individual Asset Identifier (GIAI)
- **Document Type ID:** Global Document Type Identifier (GDTI)

GS1 standards provide the needed identification framework for the PPID solution.

Planning was underway for a multi-year, major project to upgrade to a Patient Administration System. "Rather than wait on the new PAS, we developed a middleware solution to generate the GS1 patient wristbands that were not reliant on the upgrade and avoiding the delays that process would have introduced," explains Mavin. Today, each patient wristband includes the GSRN and SRIN identifiers encoded in a GS1 DataMatrix barcode to uniquely identify the patient and the "instance" of patient care. Labels associated with the clinical notes and specimens for a patient also include the same identifiers with subtle yet technically significant differences.

Sample patient identification with the GSRN and SRIN encoded in a GS1 DataMatrix barcode
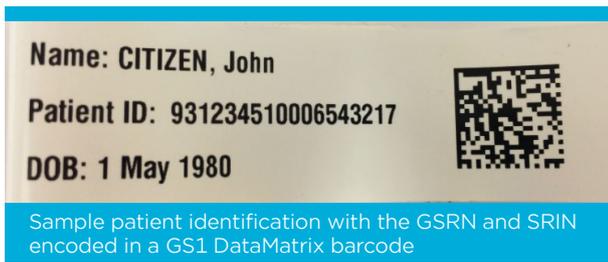
The team also worked with its existing vendors to modify the hospital's security system to print staff identification cards that used the GSRN standard. Each card includes the GSRN encoded in the GS1-128 barcode.

With any change comes challenges, yet the vast majority of caregivers and staff at Canberra Hospital appreciated the ability to work in a safer and more productive way, enabled by the PPID solution.

"Looking back, I think the biggest push back we encountered was when implementing GS1 standards on patient wristbands," recalls Mavin. "It was around the cost of upgrading our barcode scanners to support 2D DataMatrix barcodes. However, this was soon a non-issue when, put into context, it is such a small price to pay to ensure we are always working with the right patient."

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Sample staff identification card with the GSRN encoded in a GS1-128 barcode

PPID solution in action

With the PPID solution in place, a nurse or phlebotomist can now scan barcodes each step of the way when identifying a patient and the specific pathology lab test to be administered.

Here's an example of how the new process works:

- The collector (doctor, nurse or phlebotomist) selects a patient from a pending collections list. Using the ACT Health Clinical Portal displaying the specimen collection screen, he first verbally confirms the patient "is who he thinks she is" with the patient verbally confirming her name, date of birth and address.

- Upon scanning the barcode on the patient's wristband, the system recognises that the patient is not the right patient for the ordered pathology test. This is a near miss since either the collector has not sufficiently confirmed verbally the patient's identity or the wrong wristband has been placed on the patient. With this, patient safety has been preserved, and the near-miss detail is automatically captured within the system, available for analysis.

- With the right patient identified and verbally confirmed, the collector needs to scan the patient wristband. Instead, the collector scans the patient's GSRN identifier on the clinical notes label (which may be away from the patient bedside). The PPID system does not accept the patient identifier because it is not the same as the one on the patient wristband; the collector cannot proceed until the correct wristband is scanned. Once again, patient safety has been preserved, and the details of the incorrect identifier scanned have been recorded.

"This is perhaps the most significant point of differentiation for the PPID solution driving patient safety," explains Mavin. "The wrong-blood-in-tube incidents were typically a result of blood collections being taken from the correct patient, only to then become inadvertently switched with another patient's specimen before being submitted to the lab. This happens when order handling and labelling is performed away from the patient for a batch of collections."
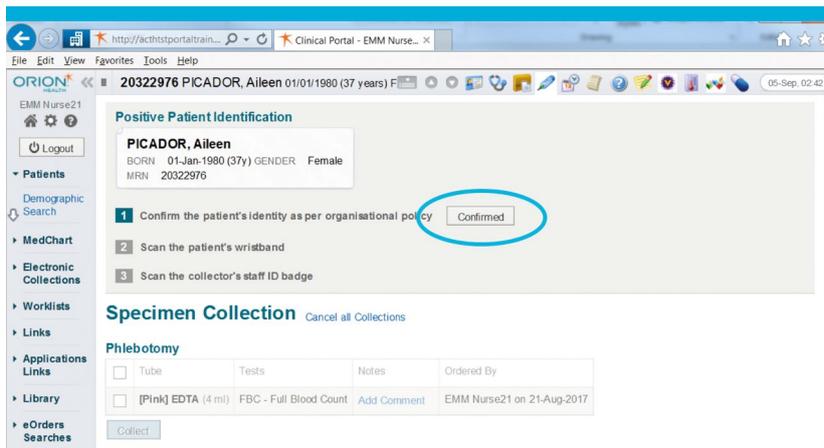
Positive Patient Identification is displayed in the top half of the screen. All collection features are disabled until the collector has successfully completed the PPID process.
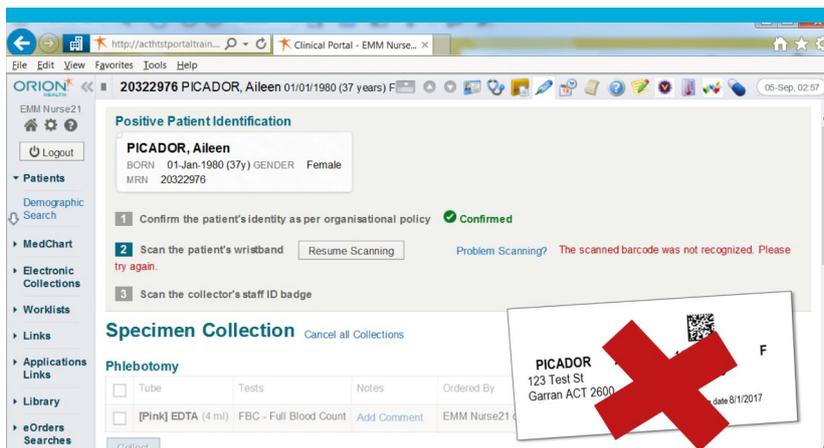
If the scanned barcodes on the patient's wristband and clinical notes do not "match," the system alerts the collector.
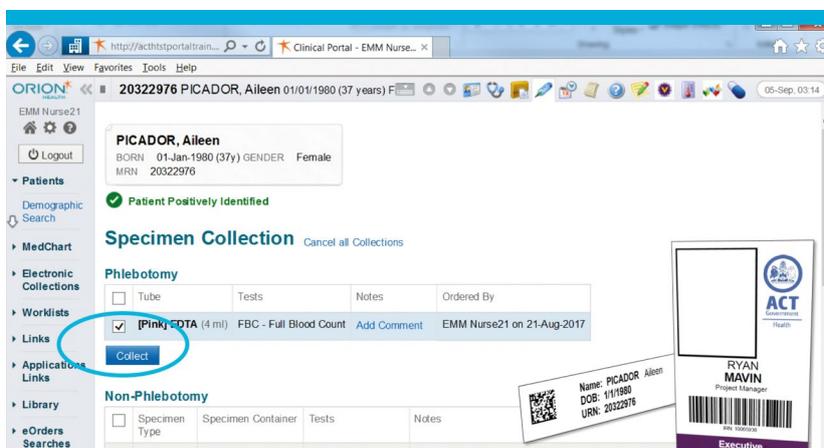
Patient safety is assured by scanning for positive patient identification each step of the collection process.

- Only when the correct patient's GSRN identifier on the wristband is scanned can the collector proceed to the next step.

- Now that the patient's wristband identifier has been successfully scanned and match, the collector can proceed by scanning his staff identification card. Only a valid staff card with a barcode is accepted. The PPID system checks the unique identifier against the ACT Government Active Directory before allowing the collector to continue.

- Once collected, the collector checks off all of the successful collections in the eOrders system and prints the required specimen labels.

100%

Obtaining 100 percent compliance with the process and policy will ensure patient safety is preserved.

40%

More than a 40 percent reduction in wrong-blood-in-tube incidents has been achieved with remaining incidents only occurring during system maintenance periods, or with orders that have remained on paper due to patient transfers.

Error prevention is a priority

The implementation of the PPID solution has focused on the need to improve patient safety and outcomes by preventing errors while supporting clinical teams in their work.

Patients benefit from only a single sample needing to be taken. Without errors, there are no delays in results and treatment. Also, the PPID solution eliminates risk associated with the wrong results and incorrect diagnosis.

Clinicians benefit by using an automated process with electronic ordering and collection that has eliminated paper order readability and transcription incidents, reducing lab data entry efforts. The solution allows them to work more efficiently and safely collect samples, reducing the risk of errors. With the PPID solution, the use of technology helps them mitigate the impact of interruptions that occur in a normal care setting.

With GS1 standards and barcode scanning applied at the point of printing the specimen labels, this ensures the physician collecting the sample performs the steps per the organisational policy.

Mavin reports obtaining 100 percent compliance with the process and policy will ensure patient safety is preserved. More than a 40 percent reduction in wrong-blood-in-tube incidents has been achieved with remaining incidents only occurring during system maintenance periods, or with orders that have remained on paper due to patient transfers.

In pathology, clear patient identification reduces errors in labelling, reduces the amount of testing needed due to incorrect labelling, saving time and resources.

Canberra Hospital has been able to significantly reduce errors related to pathology collections, reduce the number of repeated processes and costs of pathology, and better care for patients.

Mavin concludes, "Our staff are finding the easiest way to do their jobs is now the correct way, scanning GS1 barcodes each step of the way."

Scalable solution

The overall GS1 standards framework is providing the foundation for many more process improvements where positive patient identification is key. To date, the PPID-scaled solution has been implemented across all adult wards.

The key principles defined in the initial implementation are being used in the implementation of additional projects such as the tracking of blood products to patient, breast milk matching to babies, electronic medications management and administration at bedside, and more.

It's clear: There is an overall transformation of systems and processes happening at ACT Health and Canberra Hospital with patient safety and outcomes as a priority.

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Ryan Mavin, Manager Enterprise Architecture Office, ACT Health

About the Author

Ryan Mavin *is Manager of the Enterprise Architecture Office, ACT Health and has worked within the IT Industry for more than 20 years. For the past six years, Ryan's focus has been in Healthcare, implementing electronic systems to streamline clinical interaction and information capture for ACT Health. Ryan is passionate about IT interoperability, delivering better patient outcomes and enabling the industry to adapt to the challenges of an aging population. Prior to joining the ACT Government, Ryan held lead roles covering all aspects of system development and implementation as a vendor to the Finance and Gaming industries.*

About ACT Health

The ACT Health Directorate *(ACT Health) aims to deliver the best possible healthcare and health-related services in Australia, through its public hospitals: Calvary Hospital, Canberra Hospital, and the University of Canberra Hospital; Community Health; Mental Health ACT; Capital Region Cancer Service; Aged Care and Rehabilitation Service and Population Health, including the Health Protection Service.*

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