Combination of Barcoding and Smart RFID technologies will save patients’ lives and improve outcomes.

There are strong patient safety indicators to incorporate barcode and RFID tags into the patient care. While both RFID and barcodes technologies indicate very strong cases for use in healthcare, picking one technology vs. another can be tricky and may limit hospital’s options in the future. Combination RFID and barcodes on the patient tags will ensure links to existing systems by using proven and cheap bar coding technology without limiting use of RFID where possible to achieve greatest clinical outcomes.

The idea is to use Patient Tag RFID compatible barcode to reliably identify individual as the person for whom service or treatment is intended as well as tracking patient within the hospital to ensure safety and quality of care. We propose an innovative prototypical framework which will support a Hybrid (Smart RFID and Barcoding) Centralized Application Hub and infrastructure leading to improved patient safety and quality of care, as well as concomitant cost saving to healthcare institutions. The Centralized Application Hub (or gateway) is a critical part of such a framework, architected to make disparate systems (clinical units/Departments) using Smart RFID and Barcoding compatible with one another, for use in a healthcare setting.

Our initiative involves the architecting of an innovative framework, utilizing a Central Application Hub to receive data from RFID and Barcode readers that translate them it into HL7 messages to ensure compatibility among healthcare units and clinical systems. In effect, a 'Hybrid' Smart RFID and Barcoding Network Enabled Platform (NEP) will leverage existing healthcare software systems and middleware, and capitalizes on a pervasive Information and Communications Technologies (ICT) infrastructure – with emphasis being Internet Protocol (IP)- centric, and application- and device- agnostic. The reference framework is based on best practices of sensor-based networks in conjunction with emerging Service Oriented Architectures (SOA) for modern networked applications, oriented to enhanced Smart RFID devices and Barcoding applications. From a Systems Integration perspective, considerations in deploying a Hybrid Smart RFID and Barcoding system will be addressed coinciding with the development of novel medical Application Programming Interfaces (APIs) to extend the available resources and infrastructure.

Currently, RFID and barcoding technologies are working separately and require different set of devices (scanners, printers, etc) to operate. One of the limitations with early adoption of both first-generation (conventional) RFID and barcodes (a broadly deployed identification means) is that they are inherently submissive, allowing for identification with little or no support for interactivity and automation. Smart Radio Frequency Identification (Smart RFID) technologies are starting to emerge alongside Barcoding healthcare for applications. These kinds of ‘smart’ applications typically extend the role of traditional RFID to encompass aspects of both sensor and control that leverage the existing RFID and Barcoding infrastructures. In the future, it is expected that the adoption of Smart RFID in healthcare with help ‘bridge-the-gap’ between the clinical and the administrative digital infrastructures in healthcare, and will be supported by enhanced sensor networks – deployed ubiquitously and at unprecedented scale.

Smart RFID-enabled technologies can incorporate the combined advances of identification, sensor (e.g., temperature, pH, humidity, chemical), and control (actuation) facilitated by modern monitoring (vital signs) and testing (lab on chip) medical devices and technologies; this
functionality is activated in strict-accordance with overseeing healthcare policy, compliance, and verification.

WRHA is currently running a pilot in one of the regional hospital's Emergency Room as a proof of concept to use LabVIEW development tool to analyze and report patient management information (detailed information is in attached document “Using RFID system based on LabVIEW for real-time patient management”). The next step is to add HL7 interface and triggers to LabVIEW application to update locations in hospital registration system. The planning is underway to potentially expand RFID/Barcode technology in many clinical areas.

Care Provider’s badge with RFID barcode will ensure that access to clinical applications has additional level of security. It will also help to identify and address bottlenecks in patient care by running provider’s stats, on time spent with patient vs. other activities.

Barcode medication administration, blood transfusion and specimen collection are just few examples of areas that would benefit from barcode/RFID implementation.

Infant RFID bar-coding tracking will ensure that infant cannot be removed from the designated area without setting off alarms. It will also ensure that baby is matched with its mother 100% of the time and eliminate errors with infant-mother mismatch during feedings when infants could be brought to the wrong room by mistake. RFID barcoded breast milk and formula will ensure that infant gets correct feedings that are properly documented in electronic patient record.

Barcoded Medication and blood administration will ensure “5 Rights” and document administration on electronic administration record and transfusion administration record. The RFID technology will also be used to track location and administration of the high-priced medications and blood products. Smart RFID barcodes on blood products will not only indicate location of the product but also help to ensure that product was properly stored by transmitting temperature data from Smart RFID tag into the clinical system to trigger alert prior to administration.

Specimen Collection barcode will positively identify patient to specimen ordered. This will eliminate need to re-test, mislabeled specimen which lead to wrong diagnosis and delay in treatment.

RFID barcodes on food trays in acute care facilities will ensure that right patient receives correct nutrition and minimizes allergic reactions.

Patient movements within hospital would be tracked through RFID and automatically update temporary location field in hospital information system/electronic patient record.

Many other barcode or RFID compatible applications can be supported by implementing RFID tag/barcode on the patient wristband and Centralized Application Hub that can transform RFID reader data into HL7 messages to be received and used by many clinical systems. Smart RFID-enablement, with its enhanced functionality, lends itself to improved fail-safe or ‘intelligent’ medical device or healthcare system interoperability, furthering its enormous benefits.