RFID in Life Science Series: Part 2

RFID in Clinical Settings
—Executive Summary—

New Dimensions in the Chain of Care

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About ChainLink Research

ChainLink Research, Inc. is a Supply Chain research organization dedicated to helping executives improve business performance and competitiveness through an understanding of real-world implications, obstacles and results for supply-chain practices, processes, and technologies. The ChainLink Inter-Enterprise Model is the basis for our research; a unique, real-world framework that describes the multi-dimensional aspect of links between supply chain partners.

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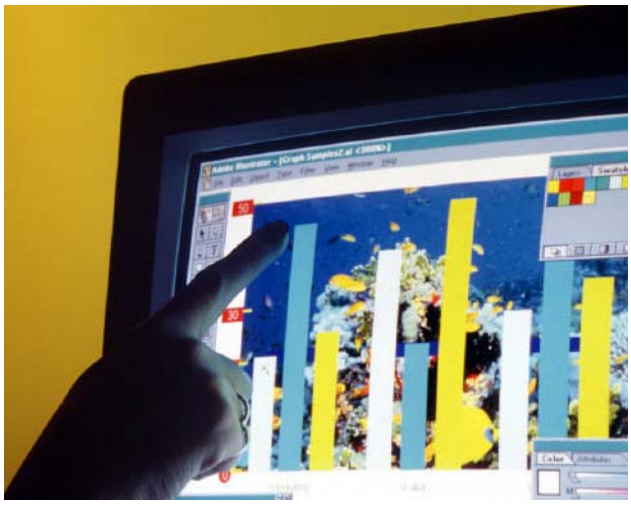
RFID - New Dimensions in the Chain of Care

Hurricane! - That was the resounding headline in the USA during the summer and fall of 2005. Records were broken as the string of hurricanes pounded the Gulf Coast, the Caribbean and the Eastern USA. The unbelievable happened when the levies in New Orleans failed to hold back the surging tide of Hurricane Katrina. Like Atlantis, the city was swallowed by water. TV screens reflected the plight of those unable to evacuate the city. Families were torn apart, loved ones lost to the water or the frenzy that followed. In the aftermath of the storm the good citizens of the US reached out – offering hearth and home to those who had lost everything. The residents of New Orleans were cast like seeds across the country. Some of the refugees from Hurricane Katrina brought more than their gratitude into the communities that took them in.. In many cases victims brought with them illnesses that could be transmitted to those in their new community, the result of exposure to polluted water, bacteria and other factors that manifested themselves in disease.

MEDICAL SYSTEMS CREATE A SINGLE VERSION OF THE TRUTH[1]

The good news is that authorities in States like North Carolina and Florida – locales that have a relatively large migrant population – had taken steps to create medical information networks in which patients with unusual diseases could be monitored. Specific symptoms are triggers to alert the system that there is a potential problem, enabling healthcare workers to 'dig a little deeper' into the patient history, identifying similarities in terms of medical history, places visited, etc. with other patients. In this manner it is possible to treat these patients more effectively, matching symptoms and cure with previous medical cases. Supported by similar initiatives in other locations in the US and endorsed by Federal agencies, these systems leverage the state of the art in technology in order to share this information across a national network of healthcare providers.



1 This is outlined in ChainLink Report – *Single Version of the Truth*
http://www.chainlinkresearch.com/research/detail.cfm?guid=F6F06550-A81A-4F05-EF17-F501BAD84E68

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A DIGITAL CASE BOOK FOR HEALTHCARE PROVIDERS

Authorities across the globe recognize the value of sharing patient and remedy data across a network of expert medical practitioners. The concept of 'tele-medicine' has been positively received in several geographies, with medical teams collaborating across digital networks – sharing patient data, radiology and exploratory test results. A Single Version of the Truth - SVOT - in order to enable health care practitioners to work in collaboration, across the Chain of Care (Care Chain) is a vision that is achievable through the combination of wireless, wired and network technologies. The potential rewards are great - the key is ensuring that the information available in these systems is accurate, timely and accessible. This requires very detailed and specific data, captured at the point of care, versus the traditional transmission of information from one system to another. Radio Frequency Identification (RFID) provides capabilities that meet this need. RFID enables identification and tracking of events, activities and entities at the unique item, patient and incident level – providing sensory data to manage the critical links in the Care Chain – real time – across a global network of care givers.

SPIRALING HEALTHCARE COSTS

Healthcare costs in the United States have always been a 'bone of contention' irrespective of the incumbent political party. Healthcare costs have been cited as a major reason for the reduction in US industrial competitiveness, an increasing problem as the cost of healthcare becomes an every growing percentage of both private sector and US government spend. A major driver is the cost of liability insurance, escalating in relation to perceived risk. This Achilles heel of the US medical system is not evident in other nations, reflected in lower healthcare costs and in many cases more innovative medical procedures. A potential solution is a 'Single Version of the Truth' across the Chain of Care, creating consistency while reducing risk and related costs.

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DIGITAL FORENSICS –VISIBILITY INTO THE CHAIN OF CARE

The world of forensics has been brought to life on the small screen through a series of popular television programs. This has created a new interest in science, and what is possible through gathering and analyzing evidence. The real world equivalent is equally exciting. Much can be learned through the examination and analysis of pathology samples. In the digital equivalent of the physical world, data captured through the Care Chain should be available for scientific review. The analysis of this digital trail of symptoms, patient data, and remedy can be compared to the forensic process that takes into account physical evidence. Digital forensics – the analysis of data streams, looking for patterns and similarities across the Care Chain – has exciting implications for patients and care givers alike. The inclusion of RFID in this process has the promise of making this information more readily available, whether the situation is the containment of a potential outbreak of a deadly virus, or something more mundane. This has important implications for all. Especially in view of the ongoing risk of health hazards on a global scale.

Tuberculosis, virtually eliminated in many geographic regions, is on the rise, and standard regimes are not working – nor necessarily available to those in need. The fear of a global resurgence is now a reality. Global travelers have returned home with more than just the spoils of trade. SARS, yet another mysterious epidemic, challenged the medical world and spurred investigations into the source of the disease. And now bird flu is threatening to cause a much bigger crisis[2]. The list of potential threats goes on.

In the next pages we will explore the use of RFID and related auto identification technology in the Care Chain. RFID is an enabler for process transformation – on the front lines of medicine today – across the Chain of Care – from product manufacturing, through each of the intricate processes in the clinical environment – to the last inch, the patient experience and cure.

2 See http://www.pandemic-preparedness.com/ for more information.

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How this report is organized:

DEFINITION OF A CLINICAL SETTING

USING RFID TO FORGE THE LINKS IN THE CARE CHAIN:

- Patient monitoring and tracking
- Asset control
- Pharmaceutical control
- Control of supplies
- Procedure control
- Cost control

OBSTACLES TO ACHIEVING THE VISION FOR RFID IN CLINICAL SETTINGS

- Network issues – medical grade network
- Frequency issues – interference and human interaction with RF
- Orientation and training of clinical practitioners
- FDA compliance and control – regulated industry
- Privacy issues – patient records/HIPPA

DEVELOPING A MODEL FOR A FUTURE FORWARD CARE CHAIN – TAKING THE 3PE APPROACH

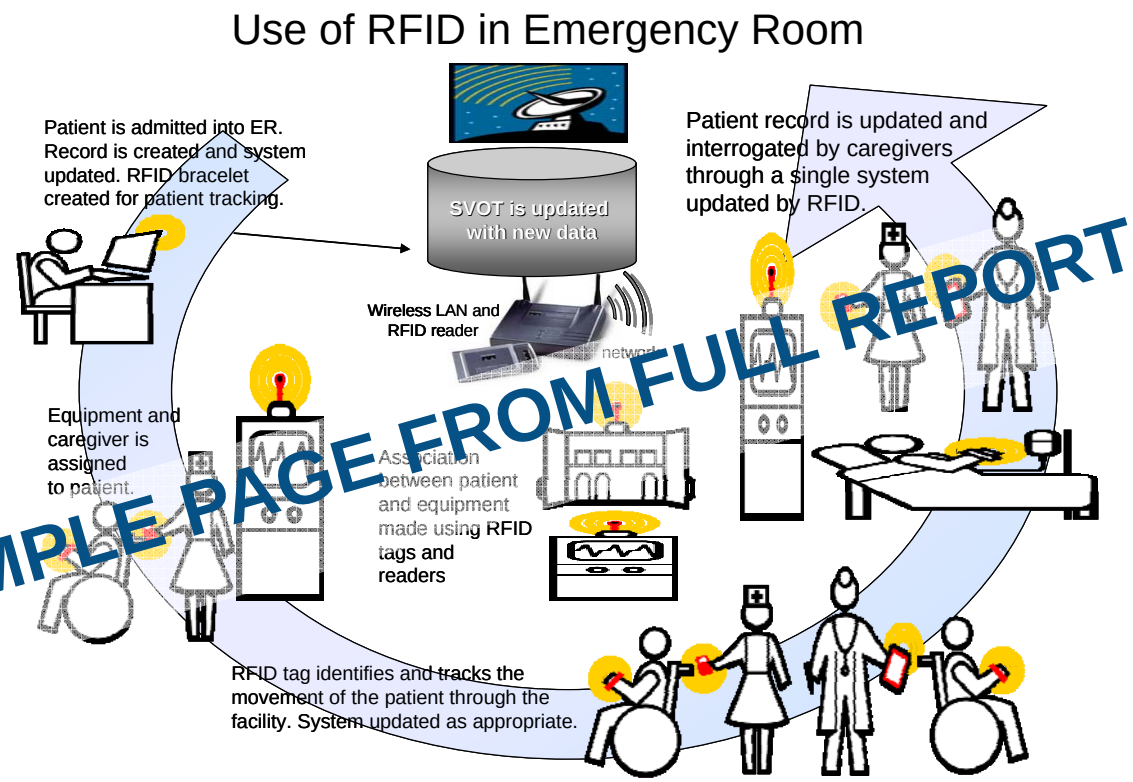
Who Should Read this Report?

- Medical practitioners – doctors, nurses, radiologists, medical core, emergency service providers
- Clinical environment management personnel
- RFID vendors – wireless technology providers, middleware vendors
- Software/Solution providers companies – across the medical spectrum
- Sales and Marketing – medical devices and pharmaceutical companies
- Health Insurance carriers
- Government, Policy and Trade associations

Because it is all about managing risk and saving lives

Another key area is the dispensing and control of medical supplies that are necessary for each medical procedure. In many cases there are specific 'kits' that include most items required in each patient situation. The introduction of RFID during the kitting process would enable a line item view of what has been consumed, enabling a more accurate view of what the true level of consumable is. (Versus the items that in many cases find their way into the disposal units, untouched). Added to which, emergency room personnel need every precious minute that an automated process would give them – versus the current necessity of a paper trail.

A conceptual view of the 'RFID enabled ER environment is depicted below:



— Figure 4 —

Operating Room

Challenges exist related to the need to monitor and control the use of pharmaceuticals, surgical equipment, and devices used in the operating room environment. In view of the high cost of many of these items (antibiotic coated stents cost approximately $5000 each), there are additional cost factors that need to be taken into account. The introduction of RFID can assist in identifying the patient – additional technologies are available in order to identify the specific location of the surgical procedure – for example left breast[4]. Additional benefits include the monitoring of all equipment and supplies used in a surgical procedure – and mak-

4 Reference Surgichip case study, on page x of this document

Application	Case Study	Technology Components
Procedure Control	Keelung Chang Gung Memorial Hospital, Taiwan	Precision Dynamics Corp. (PDC) http://www.pdcorp.com/, automatic wristband identification RFID enabled systems will be used in the hospital's operating room to identify the correct patient, surgical site, nurse, blood type and doctor, in order to help reduce human errors and enhance patient safety.
	SurgiChip – Patent pending but approved by FDA	http:/www.surgichip.com SurgiChip Tag Surgical Marker system. This product, manufactured by SurgiChip of Palm Beach Gardens, Florida, includes a tag with an integrated passive transponder. The system includes an RFID reader, an encoder and a printer.
	Ekahau	An additional application of the combination of the software and the active tags (operating at 802.11) relates to the patient throughout monitoring in both outpatient and Operating Room environments. The software component identifies bottlenecks and provides tools for scheduling patient processing based on FIFO principles.
Record Tracking	London Health Sciences Centre and St. Joseph's Health Care	Radiology and Imaging Services wanted to Create an eRadiology suite where images are stored and accessed online for easy access by caregivers. This was supported by the use of RFID for data capture. RFID tags are used to track patients from admission to discharge and make an association to the images that are then made available to appropriate diagnostic personnel. Using RFID for accuracy at the patient/image level ensures that there are no errors when reviewing these records.
Tracking of Pathology Samples	La Timone, Marseille Medical Faculty, Hospital La Conception and the Paoli Calmettes Institute.	TAGSYS ARIO™ SDM (Small Disc Module) 13.56 MHz High-Frequency RFID tags are used to reliably, accurately and securely track and manage invaluable pathology samples.
W-LAN in support of RFID	Washington Hospital Center in Washington, D.C.	Parco Wireless http://www.parcomergedmedia.com/, a developer of an ultra-wideband RFID system for healthcare facilities, has sold its first commercial installation. In October, Parco will oversee the deployment of more than 20 readers and around 100 tags for patients and staff as well as tags for equipment throughout the emergency department of the center. The inclusion of RFID for data capture will enable personnel to track patients, from admission to discharge, using the WLAN infrastructure to share data. This will streamline processes for multiple entities, to include administrative personnel, physicians, caregivers, radiology and lab personnel, as well as pharmacy dispensing and recording processes.

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