Supply Insight

White Paper

RFID Applications in Patient Tracking

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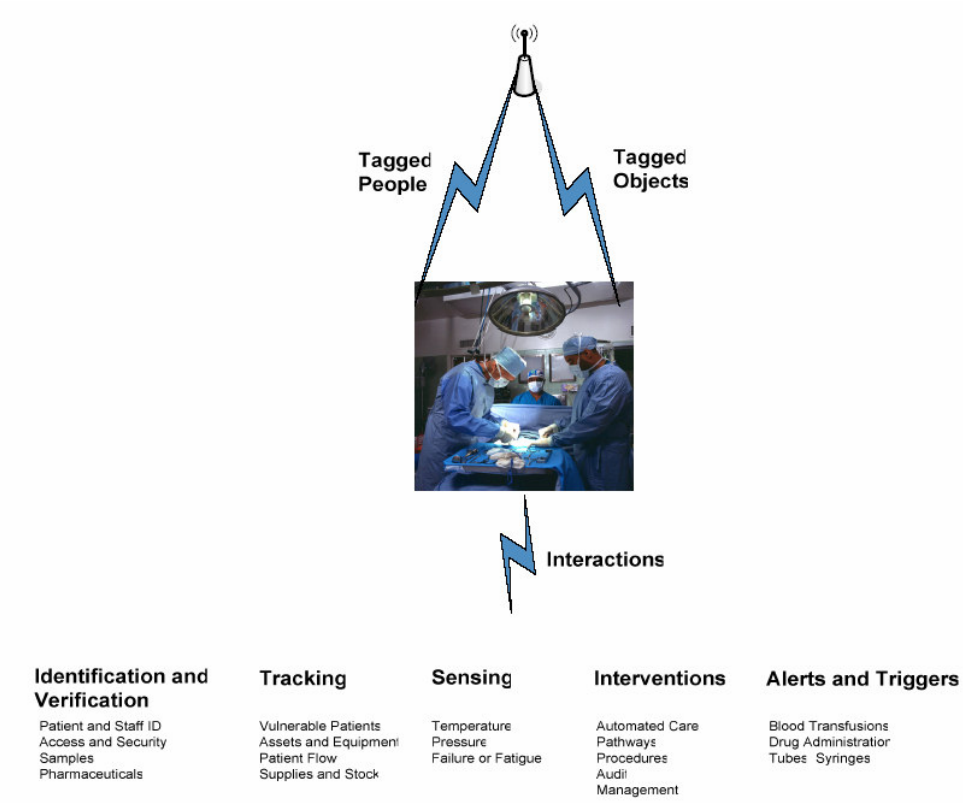
Overview

Radio Frequency IDentificaton (RFID) technology is not new if we recollect that we used this technology to identify friendly aircraft during World War II. However, with the falling prices of passive tags, RFID has thus become attractive.

The RFID tags in healthcare may be applied to people (patients and staff) and to objects, allowing the readers on door frames, wards and treatment areas to detect and record interactions. The figure below shows the potential of RFID applications in healthcare settings:



Source: Kinetic Consulting Healthcare RFID

RFID tags can be active or passive. Active tags have a battery life of several years, with a range of tens of meters and a larger data capacity compared to passive tags. The passive tags use reader emissions to power a response that is usually an identification number. Passive tags have short range and are small enough to implant under the skin. The basic advantage of RFID tags over barcodes is that you can write on them, automatically read them even if you cannot see them and read many of them simultaneously. How quickly does RFID achieves its potential is all a matter of time, but for adopters, many good reasons encourage the use of RFID technology in healthcare systems.

Patient Tracking Applications

In the healthcare industry, RFID technology is applied for patient tracking by offering wristbands containing RFID tags. The tags interact with hospital information system for automating administrative tasks like admissions, transfers and discharges. The U.S Food and Drug Administration (FDA) has recently approved a tag called

VeriChip (www.verichip.com) for use in humans. These tiny tags help disoriented, elderly and high risk patients more secure status by storing a full medical record.

With this FDA approval in the headlines, suppliers have began to offer patient wristbands containing RFID tags.

Source: Pdcorp Healthcare RFID Solutions

Even though RFIDs applications in tracking patients is less talked about, critical situations could be avoided implementing RFID tags to specific patients atleast. Consider the severity of this incident that occurred in Phoenix recently to emphasize the importance in use of RFID tags, when a patient with dementia wandered from her room and was found in the storage area after four days.

RFID tags can be supplied as wristbands or special badges with a tamper mechanism to prevent from being removed or to emit a signal if attempted to remove. The RFID readers would then be placed in specific areas of the hospital for the patient to be located within a measurable distance. The measurable distance would be defined in the system integrator working with the client so that it is small enough for the patient to be located with some confidence and large enough in the area covered by cost effective terms and the number of readers required.

The read range of active RFID varies from ten feet to thousand feet giving flexibility in setting up the coverage area. The RFID tags can also be designed to track the patients outdoor if they are outside the facility room or roaming in the campus. Special alerts can be programmed based on the needs of the facility, area or the patient.

Tag	Size	Range	Power	Comments
Passive	Smallest tag (0.4mm²). Thinner than paper. In USA approved for subcutaneous use in humans.	10mm to 6 metres. UHF: 3m or more.	Reader output	In general, range depends on frequency, reader and environment. 868-915 MHz same frequency as mobile phone, so interference with equipment is possible.
Active	Size varies, but about 2-3 cm².	UHF: up to 50m.	Battery	More expensive and larger than passive tags.
WiFi	Depends on supplier; about 5x5x2cm.	Up to 100m but shorter in closed space.	Battery	Using standard 802.11b and d. Better for locating and tracking.

Source: Kinetic Consulting Healthcare RFID Tips

The future of healthcare technology depends on the Positive Patient Identification (PPI) in reducing medical errors and adverse drug effects. Implementing RFID technology will ensure the basic rights of medical safety: right patient, right drug, right dose, right route and right time, by complying with the standards and regulations of HIPAA (Health Insurance Portability and Accountability Act of 1996, which mentions the standards of data exchange with protection and confidentiality of patient information), JCAHO (Joint Commission on Accreditation of Healthcare Organizations that emphasizes positive patient identification) and AHA (American Hospital Association stressing guidelines for tamperproof non-transferable wristband minimizing the risk of losing transferred data).

The RFID system in patient tracking provides non-transferable positive patient identification which will save lives and money through reduced medical errors and increased patient safety. The RFID technology will improve system efficiency, preventing data entry and collection errors, patient tracking and communication. The storage technology will allow data transfer to and from host system and data storage. With large storage capacity and reading ranges, RFID tags will help faster processing than bar codes. Unlike bar code, RFID tags can be read through and around human body, clothing and non-metallic materials. The bands can also be programmed and printed by direct thermal or thermal transfer printers/programmers.

RFID applications in medical administration to streamline the processes and reduce medical errors, hence improving patient safety can be achieved by:

- RFID or Bar Code reader attached to the computer to capture patient identification from the wristband or leg band

Source: Pdcorp Healthcare RFID Solutions

Source: Hospital.htm from Internet Research

- Scan the units of bar code on medication
- Information shared between the pharmacy system and the medical nurse or doctor or practioner
- Administering medication
- Assigning the tag to the patient throughout the length of the stay, the family can also securely access how far the patient care process has come to

Tagging of people or objects is interesting about RFID technology but intervention-capturing is the most appreciable potential of RFID. Tag readers connected to security systems help prevent equipment and babies/children from being removed without authority. ELPAS system is being used to track patients in Wirral Hospital NHS Trust Emergency department, Massachusetts General Hospital is using RFID to prevent blood transfusion errors, the pharmaceutical industry is testing tags to uniquely identify drugs to alert staff for incorrect drug dosage or adverse reactions, suppliers are incorporating RFID tags into instruments and equipments.

This combination of automation, identification, integration and increased accuracy has drawn attention to RFID in the healthcare industry for benefits of reduced administration time, automation of lab procedures, effective management of supplies, stock and equipment, reduction in clinical and procedural errors.

About Supply Insight, Inc.

Supply Insight is an RFID software and services company that helps its customer realize business benefits through strategic adoption of this cutting edge technology. Supply Insight offers a distributed RFID framework and a wide range of industry solutions to generate a faster return on its customers' investment. Supply Insight is a privately held company located in Hamden, Connecticut, USA.

Learn more about us at www.supplyinsight.com.

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