

newsletter

RFID in the health sector

The health sector makes particularly tough demands when it comes to quality assurance and the safety of patients; the use of new technologies, among them RFID systems, can help to raise safety standards while simultaneously reducing costs.

RFID technology Radio Frequency Identification (RFID) technology is used to identify objects and persons automatically and without contact. At present, it is mainly used in the field of commercial and freight logistics to optimise processes and reduce costs. The technology of RFID systems, as well as their potential and risks, are also subjects of discussion in relation to "Pervasive Computing", the connection of the physical to the digital world by means of information and communications systems (*Source: Swiss Re's 2006 publication, "Pervasive Computing"*).

An RFID system consists of a number of components, namely an RFID transponder with a transmitter affixed to the object to be identified, a detector, and a computer linked in via an interface or a network. The transponder, a microchip also known as a tag, is the actual information carrier; depending on the type of technology used (tags can be either active or passive) the transmitter's range can vary between a matter of a few centimetres and 100 metres, and the stored data can be read by a detection device. The data can also be forwarded to IT systems by means of an interface. RFID systems can be used to identify and track accurately objects, products and persons alike; up-to-date information is stored electronically and can be downloaded at any time. RFID on its own, however, cannot guarantee how up-to-date the information available is, as this is ultimately, dependent on the right procedures being carried out correctly.

RFID in the health sector In the health sector, RFID can be used particularly for documentation and process management, location and tracking, for administering and labelling medicines and for managing performance data. According to experts, its greatest potential for optimisation lies in the working processes associated with documentation, which is one of the most time-consuming administrative tasks in health care facilities, as well as in general process management. RFID also has potential when it comes to locating and tracking persons, materials or equipment, above all reducing searching and waiting times by tracking them down promptly and quickly, and improved information on stocks of equipment and materials makes it possible for repair, maintenance and storage costs to be reduced. To take another example, it also makes possible the monitoring of various parameters, including the maintenance of specified temperatures while products or goods are in storage or in transit, not to mention the ways in which RFID technology can contribute substantially to patient safety, for example by locating confused or mentally ill patients and protecting neonates against abduction.

RFID in clinical practice	According to studies carried out in the USA, an estimated 1 in 52,000 operations were carried out on the wrong patient, and the Aktionsbündnis Patientensicherheit (German Coalition for Patient Safety) in Germany estimates that between 100 and 240 injuries a year are sustained during the course of surgical procedures and give rise to claims. It is here that the use of RFID systems for identifying patients and procedures could make a significant contribution to improving patient safety and preventing loss events. A number of hospitals have already introduced the practice of giving newly-admitted patients an armband with an RFID transponder containing not only a unique identifying number but also the patient's basic data, which can at any time be read off on the wards using Personal Digital Assistants (PDAs). Such devices, which need to be mobile and suitable for a hospital environment, are still regarded as available only on a limited basis. Diagnostic and therapeutic measures can also be documented and stored, thus minimizing the risk of confusion and facilitating the speedy and reliable accessing of patients' particularities, such as allergies and intolerances. No patient data need to be stored on the chip itself; all that is required is an identification number for retrieving the necessary information from a database. This offers a higher degree of data protection and keeps it more secure than the alternative of storing the data on the chip.
Identification of patients	
Locating patients	Nursing homes, old people's homes and supportive environments for persons with dementia or mental illnesses, the use of RFIDs can be helpful and can help to prevent loss events by making it possible for the location of disoriented patients to be determined at any time and communicated via an alarm device. The case in which a confused patient died after wandering into a hospital's equipment rooms shows how important the use of modern security technology is.
Surveillance of blood supplies	Regulations on the handling of blood and blood products prescribe exact maintenance of temperatures during storage and transit and the clear and continuous documentation of the whole process from the time the blood is taken from one person, including its processing, testing and storage, until the time it is administered to another. This can, in practice, be labour-intensive and time-consuming. Here, too, RFIDs can be used to enhance safety while at the same time optimising procedures. For example, a system is already available which enables the temperature of blood supplies to be measured at the time of donation using the RFID chip's sensors, and accessed at any time using wireless reading devices. A number of hospitals use a monitoring system in which blood supplies are fitted with an RFID transponder on delivery, with the stored numbers corresponding to the relevant entry in the hospital's database recording the blood's source, intended use and recipient. The patient, likewise, has an RFID transponder on an armband, and a PDA enables his or her data to be matched up to that of the supplied blood. Data relating to the blood transfusion is also collected and added to the patient's data set.
Patients' medical records	Nice University Hospital fits its patients with RFID armbands recording the patient's data and documenting treatments already carried out and those planned for the future, and this information is available at any time to medical staff either on screen or by means of a PDA. By tracking the medical equipment at the same time, the treatment process as a whole can be optimised.

Problem areas RFID technology makes it possible to identify medicines beyond doubt, thus making misadministration impossible, and also facilitates the continuous comparison of all data and its consequent traceability. Data protection requirements in the health sector are extraordinarily stringent; patients must always be informed that RFID technology is being used and that unauthorised third parties can neither read nor modify the data on the transponder. The storage of a patient's complete medical records is not permitted. It must be ensured that the data stored on a transponder is safely and permanently deleted once treatment is completed.

Another factor to be considered is the possibility of interference with other electronic devices. It has been reported that the use of electronic control equipment for fluorescent tubes in operating theatres might make the accessing of data on RFID tags less than reliable. The International Commission on Non-Ionizing Radiation Protection (ICNIRP) had pointed out the need for further examination of the safety implications of electromagnetic compatibility in relation to medical technology and security systems (www.icnirp.de/documents/EASD.pdf).

As far as is at present known, the electromagnetic fields (EMF) generated by RFID systems transmitting at radio wave frequencies present no hazard to health, providing that the limits currently set are complied with. (www.aim-d.de/getasset.php?asid=131)

As RFID systems can ensure a high safety standard only if the data stored on the tag is absolutely reliable, the human factor is of considerable importance even with high tech equipment of this kind. It follows that user training and counter-checking of the data uploaded to a tag is of commensurate importance in order to avoid errors in data entry, mix-ups and transpositions.

Information for the underwriter For the health sector, the most important advantages of RFID technology are high quality and safety standards during the treatment process, combined with cost reductions and time savings. Risks are present in relation to user security, data protection, reliability and the susceptibility of RFID systems to disruption, especially in view of the very recent introduction of this form of technology into hospitals. In order that these potential risks may be recognised at an early stage, further developments should be closely monitored, especially as regards liability on the part of hospitals and physicians and in respect of products.

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