RFID for the Healthcare Sector

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PREFACE

Dear Readers,

RFID technology has huge potential for the future. According to IDTechEx, the market for RFID transponders will increase by a factor of 20 over the coming years: from 70 million euros in 2006 to 1.6 billion euros in 2016. And these figures are not only projected for the usual areas of shipping and retail. The experts at IDTechEx believe that the pharmaceutical and healthcare area is next among the various industries using RFID. For in the healthcare industry too, the advantages of this wireless technology and the scope of its uses are enormous. They stretch from merchandise logistics (for example, in managing the inventory and tracking medication), through patient identification, to localization, monitoring measurement data, and process control. A study from the Fraunhofer Institute for Software and Systems Engineering shows that RFID can improve quality, save time, and reduce costs. The technology clearly offers a significant opportunity to optimize our healthcare processes and improve patient care.

The projects presented in this publication provide an overview of what is already possible today. This includes using RFID from the moment that medication leaves the hospital pharmacy, to the point at which it is administered to the patient. This project was conducted by the University Hospital of Jena, and shows how the quality of treatment and the efficiency of patient healthcare can be improved at the same time. The publication also explains how RFID technology can be used to locate people and devices in the emergency room in Hamburg-Barmbek. By improving controls, the waiting time of patients can be reduced and the use of equipment optimized. Examples of monitoring how blood supplies are used in the University Hospital of Saarbrücken, as well as optimized bed management in the municipal hospitals in Bielefeld also demonstrate how RFID can be used to improve the safety, quality, and efficiency in the healthcare area.

The case studies show that RFID is already being applied to healthcare. The solutions presented prove that people's high expectations of this innovative technology can be fulfilled, even if RFID does not yet form part of everyday hos-

Dr. Andrea Huber
Managing Director, Informationsforum RFID

pital life. Yet despite the optimistic outlook, there are still certain goals to achieve before the technology can meet its full potential. This publication provides information about the advantages and the many application areas of RFID in healthcare, and thereby contributes to the use of modern technology in the future of healthcare.

With kind regards,

Dr. Andrea Huber,
Managing Director, Informationsforum RFID

RFID – Potential for the Healthcare Sector

The German healthcare system is facing constant pressure to reform. Service providers in the outpatient and inpatient sectors, as well as other branches of social services, are constantly challenged with having to increase quality and reduce costs at the same time. To master this balancing act, managers, service providers, and insurance providers are increasing the use of information and communications technology in order to support hospital processes. The organization of structures in the inpatient sector in particular is also changing from a function-based to a process-based approach.

The areas of goods and merchandise logistics, as well as the trade sector, have seen extensive use of RFID technology over the past few years. This has resulted in significant process improvements and cost reductions, made possible by the intelligence of IT systems that handle the data read, and use it to control processes in particular. The application of these RFID „success stories" in healthcare is currently being inspected using a range of research and pilot applications and projects.

In the first half of 2006, the Fraunhofer Institute for Software and Systems Engineering (ISST) conducted a study on the use of RFID in the German healthcare system. The aim of this study was to examine the status quo of RFID use, as well as how the expectations surrounding the technology could be realized. In total, 16 RFID projects and implementations were analyzed.

These projects came from completely different areas of application. For example, RFID can be used to locate or monitor people and objects. In other cases, data transferred to the IT system from a reading device can be used to control medical and logistical processes. If the RFID transponder is equipped with sensors, it can provide information about temperature, pressure, vital parameters, and so on. Furthermore, as part of authorization management, the data from the transponder controls access to data, systems, devices, or rooms. In addition, the transponder is used to uniquely identify people (patients, care workers, doctors, and so on), for example, by patient ID wristbands.

The application areas mentioned here demonstrate that the scope for using RFID in healthcare is particularly large, especially in the area of inpatient facilities. In the study, RFID was used to identify and track blood bags, control elevators, monitor newborn babies and patients suffering from dementia, automate documentation processes, locate devices and people, control laundry processes, and support medicinal safety and security. Applications in the pharmaceutical area were not included in the study.

Analysis of the case studies in question showed that the research and development aspect of the applications often came to the fore. That is to say, during the project, a specific RFID-based solution was developed to solve a problem (for example, controlling elevators, supporting medication, or controlling laundry processes). However, these solutions can also be used as templates for similar applications in other hospitals, therefore acquiring product character. An exception here is baby monitoring systems, which have already reached product maturity to a large extent. The distinctive R&D character of several projects is

also one of the possible reasons that detailed costbenefit analyses were possible in only a few cases. Furthermore, some of the basic business data was missing and so an analysis could not be carried out, or in other cases, qualitative aspects (in the sense of improving healthcare) formed the central project goal. Benefits can be observed in the areas of quality, security, costs, and time.

It must be acknowledged that the potential of RFID in healthcare can be seen in several areas. Alongside individual applications of RFID technology, the future may be in the area of larger platform approaches. RFID offers the potential to automate a large number of processes, for example in the area of documentation, thereby relieving medical and care workers of tasks that do not fall under their job description. By identifying personnel, equipment, and materials, it is possible to measure and evaluate medical processes (who gave what to which patient and when?) and business data (such as the use of materials). This also creates the basis for business controlling „in real time", which after the introduction of flat rates for hospitals, will be increasingly important and decisive for a successful presence in the competitive market.

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APPLICATION AREAS

The dynamics of the attempts and willingness to reform the German healthcare system have significantly increased over the past years. Growing (and international) competition and increasing cost pressures are the basic causes of this willingness to change. Medical, logistical, and organizational processes must be made more efficient. At the same time, the quality of patient care and treatment must be improved, and process-related weak spots and security gaps filled. RFID can make a significant contribution towards achieving these aims.

The use of RFID in healthcare can be divided into five main areas of application:
1. Process control and documentation
2. Localization
3. Personalized patient medication and identification
4. Monitoring of measurement data
5. Counterfeit protection

Fast and Reliable: Process Control with RFID
According to several experts, the area of process control has a significant optimization potential for using RFID in healthcare. Here, technology can help make processes more efficient. Advantages, for example, include improving the distribution of resources, optimizing merchandise logistics of hospitals, or controlling how funds are spent more effectively. Another advantage is the high level of technological development in this area, meaning that the

return on investment can be achieved quickly. The same applies to automating documentation processes. These form some of the most time-intensive administrative tasks in everyday work processes in hospitals and outpatient clinics. Employees could be relieved of these tasks if the majority of the documentation was automated using appropriate technology, for example, for using or cleaning equipment. This is an ideal area in which to apply RFID technology, especially in terms of reliability and saving time. The experiences of users show that even error margins can be considerably reduced, and that a significant time saving can be noted. Furthermore, employees welcome the technology since it relieves them of time-intensive work.

Focused: Transponders Providing Information
With localization, the focus is on tracking and locating people, materials, and equipment using transponders. This includes using actual positioning systems, which use active transponders to determine the relative location, and more simple solutions using passive transponders, which register the person or device when he, she, or it passes through an RFID portal. The benefits of an improved positioning system result primarily in a reduction of search times, meaning that people and equipment can be found quickly, and information about the material and device status can be enhanced.

RFID technology can be applied particularly to drugs, medical equipment, hospital equipment, and operating equip-

ment. For example, it can be used when preparing and performing an operation to better monitor the status and number of surgical instruments and devices. Instruments „forgotten" inside the patient should therefore be a thing of the past.

Finally, RFID can play an important role for patient security, whether it is protecting newborns from being kidnapped from the hospital, or caring for patients suffering from dementia. By providing patients with an RFID-based wristband, hospitals can ensure that an alarm, for example, is triggered if the patient leaves the healthcare facility unaccompanied.

Correctly Administered: RFID-Supported Medication

Even if the exact degree is disputed, everyone agrees that mistakes when administering medication are among the most common errors in the medical profession. A basic cause of this is insufficient information about the exact type, quantity, and administration time of the drugs supplied. RFID improves patient safety by providing personalized medication. A personal RFID transponder, such as a wristband, protects patients by storing all information uniquely in the hospital's IT system and assigning it to the patient. In this way, the correct patient receives the correct medication at the correct time. Patients' electronic files can also be enhanced with detailed information about the medication by using an RFID transponder. Allergies and other important information that affects patient care can also be read effectively at any time.

Always in Sight: Measuring and Checking Data

This area involves measuring and checking vital signs of patients; it is also relevant to product logistics in the medical area. The advantage of using RFID for the patient is that the measurement data obtained from monitoring vital signs can be integrated into a corresponding alarm system, which is activated if the value limits are exceeded. For example, RFID can be used to monitor the blood values of diabetics or patients who have suffered a heart attack.

Another use is to check that a specific temperature is maintained along the entire product supply chain. This problem was largely unsolved until now, and has previously had significant consequences: if specified temperature ranges are not adhered to, products such as temperature-sensitive drugs or blood reserves become practically unusable.

Device monitoring, including frequency and duration of use, is also fundamentally more efficient and reliable. This data, which is transferred directly to an IT system, can be used as the basis for maintaining and repairing equipment.

Counterfeit-Proof: Identifying Medicine with RFID

A subject with increasing significance is protection from drug counterfeiting, not only in developing countries but also, for example, in the United States. Here too, RFID can make a fundamental contribution to patient safety. Radio technology enables medication to be identified uniquely and data to be compared on an ongoing basis. In this way, counterfeits can be easily distinguished from actual products.

RFID IN PRACTICE I

University Hospital of Jena: Tracking Medication
Since fall 2006, the University Hospital of Jena has been using RFID to track medication administered to patients in intensive care. The system uses technology developed by SAP and Intel to monitor and document the movement of medication from the hospital pharmacy to the point at which it is administered. As part of this, three chains of medical care in the hospital's core processes were analyzed and combined into one universal RFID-supported process. This has allowed the transport route of collective drug containers and individual drug packages to be tracked in real time. The aim of the RFID project is to increase the quality of care for hospital patients, as well as the efficiency of patient management. In addition, the risk of administering incorrect medication should also be significantly reduced.

Reducing Sources of Error: Advantages for Patients and Staff
When patients are admitted to intensive care, they are issued with a wristband containing an RFID transponder on whose chip a numeric code is stored. Care workers read this code using a handheld scanner, which calls the corresponding data from the hospital's encrypted IT system and displays it on the device. Medication from the hospital pharmacy is also fitted with a transponder, thus allowing the handheld device to access information about the drug and assign it to the patient data. In this way, the administration of drugs can be monitored and any incorrect administrations avoided. By comparing the data with the patients' electronic files, staff can request information about existing allergies or special care requirements before treatment. Consequently, care workers can obtain information about possible intolerances quickly and securely, and take corresponding steps towards treatment. The RFID-supported system automatically documents the administration of drugs in the patients' electronic files in the hospital's IT system, with precise data about the medicine, quantity, and time of administration. This results in a continous treatment history for each patient; incorrect administrations due to confusion are thereby significantly reduced.
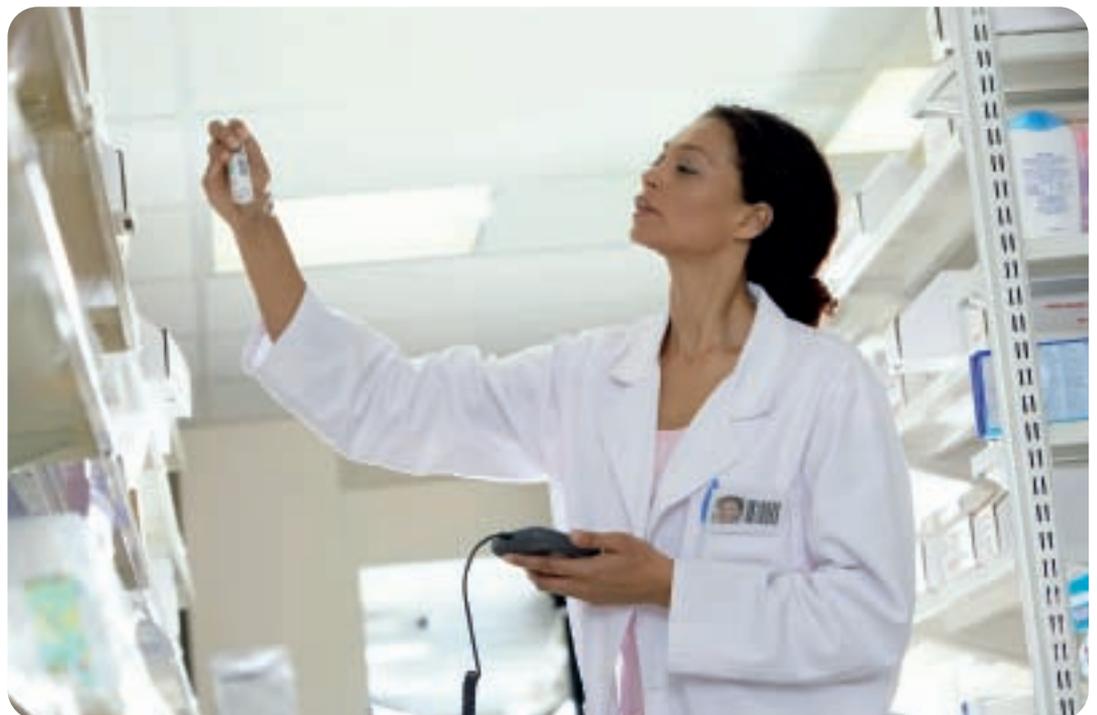
Keeping Costs in Hand: Advantages for Management

With the RFID solution, the University Hospital of Jena has afforded itself not only improved patient care, but also cost savings within the supply chain. By automating replenishment processes, reducing stock, and increasing processing speed, the university hospital intends to lower costs and improve the speed of treatment. In addition, savings can be made thanks to a reduced working capital, fewer losses of medication, and an avoidance of cost-intensive processes, for example, when disposing of expired medication.

However the scope of potential process improvements depends on the seamless integration of central applications and databases along the whole information, supply, and utilization chain. Only then can the considerable potential of extensively using RFID and IT actually be leveraged.

DATA PROTECTION: SECURITY AND ACCEPTANCE

The issues of data protection and security have been part of the general discussion about using RFID solutions for some time. In an area as sensitive as healthcare, high standards must be met when it comes to protecting patient data. In particular, this involves adhering to the rules laid down by the German Federal Data Protection Act, which for example, has specific regulations about saving personal data on mobile storage media such as chip cards.

At the same time, transfer procedures and the data saved in IT systems must be protected from misuse and unauthorized access. To achieve this, a reference code similar to a serial number is assigned to each transponder; secure encryption options are also available.

Finally, it is important to explain this to patients so that they accept this new technology. Information about how the technology works and the advantages of RFID, as well as transparency in terms of data processing, are essential.

RFID IN PRACTICE II

Asklepios Hospital, Hamburg-Barmbek: More Time for Patients

Using RFID and other wireless technology to locate equipment and people will be part of everyday life in the hospital of the future. Thereby efficiency of the equipment will be increased and waiting times reduced.

This future has already begun in the emergency room at the Asklepios Hospital in Hamburg-Barmbek. As part of its „Future Hospital Program", the hospital is working together with partners to develop new usage scenarios for IT. Different technology is being put to the test in everyday hospital life, with the aim of making hospital processes with IT support more efficient.

The main project concerns the location of devices and patients. To achieve this, the entire building has been fitted with WLAN (Wireless Local Area Network) access points, which can also communicate with active RFID transponders. Consequently, a separate RFID infrastructure was not necessary. Another advantage of this solution is its potential to support additional application scenarios using WLAN.

The project will be implemented in two phases: first, only medical devices will be fitted with transponders, allowing them to be located at any time. In the next stage, the technology will be used to locate patients as well. When patients are admitted to the emergency room, they receive a patient ID wristband with an active RFID transponder. This means that they can be located in the same way as equipment. Alongside improved efficiency and shorter waiting times, priority patients can then also be treated faster.

Emergency Scenario: RFID Helps with Localization

By using patient wristband, it is possible to significantly improve emergency-room processes using a „dashboard" solution (large-format screens). In addition, the solution can be used to locate mobile devices such as ECGs quickly, thereby saving precious time. After all, in the hospital, every second counts.

The screens provide doctors and other care workers with information about device statuses, occupancy of rooms, and waiting times of patients. Devices that are fitted with an RFID transponder are shown on the monitor as a conceptual image. The screen also shows whether a room is occupied, the priority of individual patients, and how long a patient has been waiting. A screen that can be viewed only by medical personnel also shows patient names and their corresponding diagnoses.

The solution also offers an additional, important benefit: The wristbands are designed so that they can be used to monitor important cardiological values at the same time. For cardio patients, this support can be vital.

RFID IN PRACTICE III

University Hospital of Nice: First-Aid in Seconds
As part of the „New Generation Hospital" pilot project, IBM developed an RFID solution for the University Hospital of Nice to improve patient management and care in the emergency room. As opposed to Barmbek, the function for locating patients was integrated immediately. Patients receive their encoded wristband, and in addition, all medical devices and the tablet computers of doctors are equipped with RFID transponders.

Data on Demand: CEP Records Treatment
Immediately upon arrival in the emergency room, each patient in the New Generation Hospital is given a wristband that remains with him or her throughout the time in the hospital, and that maintains permanent, wireless contact with a "CEP" (Complex Event Processing) engine. This records all patient information in real time, which is then available to medical personnel both on the large LCD monitors (dashboards) and on the doctor's tablet com-

puters. The medical status of the patient, as well as the treatment administered or outstanding, are documented and can be displayed.

By simultaneously tracking medial devices and their use, the treatment process can be streamlined and improved. Medical personnel are informed of all necessary treatment of a patient at all times and in every area of the emergency room, and can administer the treatment as required. Using the underlying information system, the attending physician can view patient files at any time and immediately access the current examination results.

SPECIAL APPLICATIONS IN FOCUS I

University Hospital of Saarbrücken: Monitoring Blood Reserves

At the end of 2004, Siemens introduced Germany's first RFID system to identify patients at the University Hospital of Saarbrücken. In the same way as the University Hospital of Jena today, when patients are admitted to the hospital, they receive a wristband containing an RFID chip, which stores the patient number. Hospital staff can read this number using RFID devices, such as PDAs or tablet computers. Doctors and other care workers can use these to identify patients in seconds, and by accessing a protected database online, are able to view details about the patient history and the medication that has been administered.

In 2006, the University Hospital of Saarbrücken enhanced its RFID patient care by introducing a monitoring system for blood reserves. Upon receipt, each blood reserve is fitted with an RFID transponder that contains a number, thus allowing the reserves to be tracked continuously. The numbers correspond to an entry in the hospital's secure database, which contains information about the origin of the reserve, its purpose, and the recipient.

When care workers bring the blood reserve to the patient, the PDA is used to determine both the RFID transponder on the packaging and the patient number of the RFID wristband. An immediate data comparison then ensures that the patient receives the correct blood reserve. The new treatment data is then transferred immediately to the clinical process and the patient's data record. Constant monitoring of blood reserves means that transfusions can be carried out not only more safely, but also more efficiently and at a reduced cost. Precise tracking and documentation provides real-time support for all logistics processes that staff have to monitor and control, from the blood bank to the patient.

A Look at the Cooling Chain: Sensors Check the Temperature

Siemens is now working together with Schweizer Electronic, the blood bank of the University Hospital of Graz, and the blood bag manufacturer MacoPharma to develop the next stage in managing blood reserves more efficiently. In the future, blood reserves will be equipped with temperature sensors to consistently monitor the cooling chain.
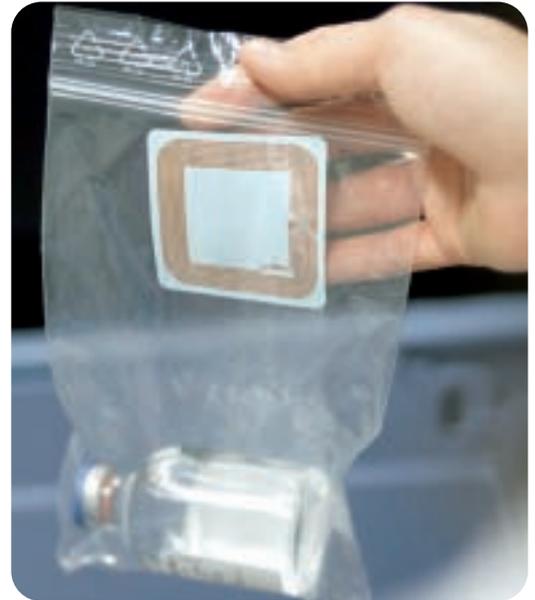
This is important since several blood reserves today have to be destroyed because the temperature was not monitored, or was not monitored sufficiently.

Temperature management is therefore imperative because immediately after blood has been donated, it is processed to become standard blood products. For example, donated blood is used to produce a concentrate of red blood cells, platelets, and plasma. During the different process steps, from donation and processing, through testing and distribution, to storage and transfusion, various temperature profiles must be adhered to constantly.

Extreme Conditions: Special Transponders Required

RFID transponders with temperature sensors are attached to the blood reserves immediately after donation. The temperature can then be read at any time using radio-based reading devices. The transponders have to be able to withstand extreme conditions: During manufacture, they have to undergo a sterilization and pasteurization process, and during processing, the blood bags are centrifuged at a speed of 5,000 times that of acceleration due to gravity. The newly-developed RFID chips passed the test and will be checked at the end of the project by the regulatory authorities to make sure that they are suitable for commercial use. The system should be implemented in 2008.

German Red Cross – Blood Donation in Saxony: Testing RFID Tags

In some test series, the blood donation service of the German Red Cross in Saxony examined the use of RFID tags. They were to prove their effectiveness along the entire process chain of a blood bag when compared to barcodes, which are significantly more time-intensive in terms of the documentation involved. The results of the test using a total of 3,500 tags were extremely promising: the process chain (from manufacturing the blood bag, through donation, processing, and distribution, right up to transfusion) not only contains fewer errors, but can also be organized more efficiently. Among the significant advantages is the bulk recognition of blood products in the incoming goods inspection. This was previously a very time-intensive process, since the use of bar codes meant that each blood bag had to be checked in separately. Furthermore, finding and managing blood bags in the warehouses can be made significantly easier. Considering the relatively short shelf-life of blood products, this is a particularly important aspect.

Another plus for RFID technology is its universally high acceptance by personnel. Although pilot projects usually mean increased work in everyday life, for the employees in question the advantages of RFID, such as the avoidance of errors, ease of use, and future reduction of unnecessary work were far more important.

SPECIAL APPLICATIONS IN FOCUS II

Pharmaceutical Industry: Temperature Checks Along the Supply Chain

Temperature fluctuations can have a negative effect on the life of medical products such as vaccines. The shelf life may be shortened and the product may become unusable. If there is no information about the temperature, the product must sometimes be destroyed anyway because of suspected temperature fluctuations. A new RFID solution allows the exact temperature to be checked during goods transport: Technology and Innovation Management at Deutsche Post World Net (DPWN) has worked together with IBM and a large pharmaceutical group to develop radio technology for the pharmaceutical industry. An RFID sensor tag checks and documents the temperature of goods shipments throughout the entire transportation process. Measurement data can be viewed at each read point, meaning that senders, receivers, and transporters can continuously monitor the status of the products.

The sensor tag is a combination of a temperature sensor and an RFID radio chip. It allows a previously defined temperature range to be monitored and recorded constantly.

The data can be read at any time without the shipments having to be opened. The special design of the sensor allows it to be placed especially close to the product. Furthermore, the remaining shelf-life of the product can be calculated and displayed at any time. Previously, this was possible only at the end of the shipment.

Innovative: RFID-Supported Shipments

First, transponders in diagnostic materials shipped overseas were tested. The sensor tag is a project of the „DHL Innovation Initiative", which resulted from a strategic partnership between DPWN, IBM, Intel, NXP (previously Philips Semiconductors), and SAP. The aim of the initiative is to develop innovative solutions that increase the efficiency of supply chains. To this end, the new sensor tag goes far beyond merely identifying objects. Instead, it offers a new perspective, not only for the pharmaceutical industry, but for all industries that require a solution for the sensitive task of temperature-managed shipments.

Distinctive: Packaging with RFID Transponders

Another example of using RFID to track medication is the RFID solution developed by Siemens and the packaging manufacturer Limmatdruck/Zeiler for counterfeit-proof pharmaceutical products. Every year, medical goods to the approximate value of 40 billion U.S. dollars go missing. Experts believe that throughout the world, one in ten drugs is counterfeited. The problem can be resolved using RFID. This innovative technology has several benefits for the pharmaceutical industry: besides a high level of assurance against counterfeits, transparent logistical processes can be implemented with location determination and economic stock management. In addition, the continuity of cooling chains can be verified, thereby improving production planning and returns management.

Fail-Safe: RFID Transponders with Standard Frequency

Using a specially developed packing machine, RFID transponders are attached either to the outer packaging or to the packaging of individual products, vials, or syringes. The transponders work with a frequency of 13.56 MHz, which is a standard frequency that is relatively insensitive to interference that could be caused by metals or liquids.

The new machine can be integrated into every existing production environment, and is controlled using a PC. So that batches can be tracked accurately, the RFID transmitters are synchronized with the time on the PC. Using an interface, the system can also be integrated with higher-level production control or an ERP system such as that of SAP.

SPECIAL APPLICATIONS IN FOCUS III

Municipal Hospitals in Bielefeld: Bed Cleaning on Demand

Regardless of whether a patient lay in a hospital bed for a few hours or for several days, whether the treatment was for an infectious illness or simply for a sprained ankle, all beds at the municipal hospitals in Bielefeld previously underwent a complete and costly cleaning process after they had been occupied. Hospital managers generally did not know how long it would take for a bed to be cleaned and made available on the ward again. Thanks to RFID technology, the bed cleaning process can now be adapted to those tasks actually required. This is the result of a pilot project by Siemens Business Services and the bed manufacturer Joh. Stiegelmeyer GmbH & Co. KG.

RFID Transponders Monitor Hospital Beds

As part of a unique project, every bed in a ward in the municipal hospitals in Bielefeld has been fitted with an RFID transponder, which allows the bed to be uniquely identified using radio technology. At the entrances and exits to the ward, as well as at the central preparation unit, reading devices detect the beds and transfer the data to the bed management software. When a bed is taken from the ward for cleaning, the software detects how long the bed was in use and automatically issues instructions for cleaning. A bed that was used in the ward for just one day simply requires disinfecting. Only after the third day of use does a bed require thorough, overall cleaning. In addition, the software stores repair information and maintenance intervals, which are displayed automatically when the bed is transferred to the preparation unit.

The RFID pilot project has demonstrated the significant cost-saving potential for hospitals in Bielefeld. Cleaning times and expenses can be reduced, along with the quantity of cleaning products required. The hospital can also determine how long a bed will remain in the preparation unit before it becomes available again. The RFID transponder provides information about how long the bed takes to be transported from the ward to the preparation unit and back. Besides reducing costs and improving cleaning processes, the process also increases the utilization of the beds.

Previously, each item of laundry had to be sorted by hand, whether it was an operating gown or a bed sheet. Laundry can be presorted much more quickly using RFID. When an item of laundry is received by staff for the first time, an RFID transponder is attached to it. Once the item has been fitted with a transponder, data such as the owner and washing instructions are entered in the computer system.

Once the laundry item is equipped with RFID, the presorting process is started, whereby individual items are scanned and registered automatically using a sorting system and reading device. A monitor indicates the laundry cycle in which the item is to be placed. After the usual laundry process (washing, drying, and ironing), the RFID sorting system is again applied to the ironed items: Just like at the dry cleaner's, a batch of clean laundry is attached to a carousel. Once complete, the items can be sorted by floor, room, and person.

Quickly Sorted: RFID Increases Competitiveness
Not only is laundry presorted faster – dirty laundry no longer has to be sorted by hand, as is the case with bar code reading. This improves working and hygiene conditions. In addition, items are lost less frequently thanks to continuous data management.

The RFID-supported laundry process also contributes to increasing the competitiveness of hospital laundry oper-ations. The practice of outsourcing this labor-intensive service, especially to Eastern Europe, can therefore be avoided.

Queen Elisabeth Herzberge Gmbh, Berlin: RFID for Industrial Laundry
A further area in which RFID can be applied to the healthcare sector is in identifying textiles in industrial laundry. Especially for companies that provide laundry services for individuals (for example, hospitals, residential homes, and care homes), using RFID can increase working effectiveness. The hospital laundry at Queen Elisabeth Herzberge GmbH in Berlin, which also serves retirement homes and other hospitals, uses an RFID- supported laundry process. The aim is to cut costs by accelerating and automating processes, for example, when presorting the laundry.

OUTLOOK

The projects presented here demonstrate that there are several options for optimizing the healthcare sector with RFID. However, they also clearly show that there is currently no widely established and standardized way of using the technology. According to the study „Monitoring eHealth Deutschland 2007", only 2% of German hospitals currently use innovative radio technology; however, approximately one in five hospitals plans to introduce RFID. The biggest advantages are in reducing costs and saving time, while at the same time improving quality and safety during treatment. The last point in particular deserves attention – the example of personalized medication shows the potential that this technology has to offer in improving the quality of patient care. In the United States, both the Federal Drug Administration (FDA) and the Joint Commission on Hospital Accreditation (JCHO) have made clear recommendations for using real-time technology in the healthcare sector.

Added to this are the potential cost savings that can be made by using RFID. For example, Spanish studies have shown that due to incorrect medication, the costs caused by longer hospital stays or additional treatment can reach 3,000 for each affected patient.

Of course, before RFID healthcare solutions can be used across the board, further progress must be made. Absolute read accuracy is essential for several applications. The technology must also be fail-safe since it is sometimes used in extreme conditions (for example, in the centrifuge). National and international standardization provide another argument for extending the technology to the pharma-

ceutical area. For example, international workgroups at EPCglobal are working on the requirements for using RFID in healthcare. Finally, the basic processes for using the technology have to be optimized, both inside and outside the hospital: external, RFID-supported merchandise logistics must be better integrated into the existing IT systems of the hospitals to improve integration with the pharmaceutical areas, among others.

To achieve this goal, manufacturers and suppliers from the world of business, as well as political decision-makers in the healthcare sector and hospitals themselves, all have to put the subject on their common agenda. Introducing RFID to healthcare can be achieved only by a joint effort. The goal is to meet the necessary HR, organizational, and technical requirements for the largest possible implementation of RFID, and to thereby support the necessary healthcare reforms using information technology.

INFORMATIONSFORUM RFID

The Informationsforum RFID e. V. was established in April 2005 with the aim of making the public increasingly aware of the future and innovation potential of radio frequency identification (RFID) and promoting the use of this promising technology in an open dialogue.

Disseminating information

The mission of the Informationsforum RFID is to explain RFID to the public, to provide comprehensive information to political decision-makers, media representatives and consumers, and to describe the variety of uses offered by the technology. For this purpose, the forum disseminates factual information with which people can objectively evaluate the technology. In addition, the association contributes to the effort to bundle and clarify open questions – on issues such as standards, frequencies, the compatibility of various systems, and legal regulations.

Promoting dialogue

The Informationsforum RFID views itself as a platform for dialogue. It offers representatives from politics, business, academia, and media, as well as interested consumers an opportunity to exchange views about the technology. The information forum is a skilled intermediary among technical development, technical information, and political evaluation.

The impact for Germany as a technology site

One of the chief responsibilities of the forum is to underscore the potential of RFID for the future of Germany as a technology site. The representatives of the forum actively contribute their knowledge to the social debate. Using concrete application examples, the Informationsforum RFID communicates an understanding for the technology and its benefits.

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