Efficiently managing inventory of medical devices using RFID

ABSTRACT

To save time and resources during the annual stocktaking of medical devices, the Center for Medical Research at the University Hospital of Graz (Austria) implemented GS1 Standards and invested in Radio Frequency Identification (RFID) equipment. A SmartID™ Framework was implemented at the hospital, developed in collaboration between the University of Applied Science Joanneum (Department for Healthcare Engineering), GS1 Austria and RFIDInnovations GmbH. Leveraging GS1 Standards and Electronic Product Code (EPC)/RFID technology, the hospital reduced the time needed for annual stocktaking by more than 96%.

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The pain of managing inventory in hospitals

In many hospitals, managing inventory is not a very popular task as it is a cumbersome, resource intensive process of stocktaking every year to physically verify the location, quantity and condition of items. Hospital staff needs to inspect all stock items, counting everything, clearing out, re-arranging, correcting and clearing final errors, writing off stock, or starting all over with warehouse entries. Stocktaking results in a lot of work for the hospital, so it is obvious that optimising this process can save a lot of time and money.

In collaboration with GS1 Austria, three important areas for improvement were identified: unambiguous identification of items that can effectively be read, controlled processes, and processing data.

Various GS1 Standards can optimise these processes, including: GS1 Identification Keys, such as the Global Trade Item Number (GTIN) and the Global Individual Asset Identifier (GIAI); GS1 BarCodes, such as the GS1 DataBar, GS1-128 and GS1 DataMatrix; and GS1 Electronic Product Code/Radio Frequency Identification (EPC/RFID), such as Ultra High Frequency (UHF) EPC Gen2.

Each technology offers advantages to the company, and the GS1 Standards provide security and harmonisation for investments in inventory management systems and during the configuration of the interfaces.

SmartInventory Project at the University Hospital of Graz

In the Center for Medical Research at the University Hospital of Graz (Austria), all medical devices are registered in the in-house facility management system and further assigned to specified rooms. Whether those devices are actually located in the right room is also checked during the annual stocktaking. It often turned out that loaned devices were physically moved to another room, but this was not captured in the in-house facility management system. The stocktaking and the subsequent re-allocation required a lot of time and resources.

This motivated the hospital to implement GS1 Standards and invest in RFID equipment. Over 100 rooms were marked with Global Location Numbers (GLN) and over 1,500 medical devices were marked with a Global Individual Asset Identifier (GIAI). A SmartID™ Framework was implemented at the hospital, developed in collaboration between the University of Applied Science Joanneum (Department for Healthcare Engineering), GS1 Austria and RFIDInnovations GmbH.

"Leveraging GS1 Standards and RFID/EPC technology allowed the hospital to reduce the time and effort needed for annual stocktaking by more than 96%."

Leveraging GS1 Standards and EPC/RFID technology allowed the hospital to reduce the time needed for annual stocktaking to two days instead of 14 and only required one employee instead of four. The solution reduced the time and effort needed by more than 96%. This means the inventory process is done 28 times faster than before. This tremendous reduction makes it now possible to carry out a monthly inventory and inspection of stocks.

Overcoming technology challenges

One of the challenges was to find an appropriate transponder that would fulfill the requirements of a clinical environment. The transponder needed to be suitable to function on metal surfaces, typical for medical devices, and able to be affixed upon the most different and partially abrasive surfaces of other types of devices. The adjusted Ironside of Confidex (Finland) with an adhesive foil of 3M was selected.

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A very compact and handy Personal Digital Assistant (PDA) with an attachable UHF reader was chosen as an RFID handheld. Due to the SmartID™ Framework used, the application could be configured for a variety of other mobile terminals, such as ATiD, NordicID and many more, without the need for programming.

The new process

The apparent medical device identification number from the system is directly coded in a GIAI and stored in the transponder.

At the beginning of the inventory process, the current allocation of the devices is transmitted from the facility management system onto the mobile RFID UHF readers. While scanning the UHF door plate, the user automatically receives the current set list, which is shown on the display, and enabling the user to register all devices that are stored in that specific location. If the device is in the wrong location, a warning is sent out and a decision can be made on site as to whether the current room-allocation should be updated. The corrected data can be re-transmitted into the system in order to get an accurate database.

Furthermore, by choosing the new type of chip's user profile, G2XM with 512 bit, warning data and ownership information can be saved directly on the device. In doing so, information about the owner of the device, date of the last maintenance operation, maintenance interval or activity status can be retrieved even without direct access to the facility management system.

The use of UHF technology/hardware and the SmartID™ Framework resulted in a cost-efficient and yet extensive and

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user-friendly solution for inventory and maintenance activities within a short period of time. The project clearly demonstrated the advantages of using global and technology-independent GS1 Standards in the field of RFID.

For more information about this case study, contact Barbara Dorner at: dorner@gs1.at

ABOUT THE AUTHOR

Dr. Stefan Sabutsch is Senior IT-architect and standards expert for ELGA GmbH in Austria. After obtaining a PhD degree Biology at Graz University, he worked for AGFA Healthcare in the area of diagnostic systems, laboratory information systems, pathology and cardiology. He is also a technical expert at the University Hospital Graz in Austria and lectures "Health Care Engineering" and "eHealth" at the University of Applied Sciences Joanneum in Graz. His research fields covered communication in medicine and related standards, as well as identification systems. Since 2007, Dr. Sabutsch has been Chair of Health Level Seven Austria.

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Personal Digital Assistant (PDA) with an attachable UHF reader