



# Reduce Human Error in Healthcare Operations and Medical Equipment Management

**Digitally Optimize, Operate and Manage Processes and Medical Equipment using RFID technology**

## EXECUTIVE SUMMARY

Poor compliance rates in hand hygiene, mismanagement of medical devices and mobile assets, loss of time despite work concentration due to nursing shortages, legal risks due to incorrect documentation, improper reprocessing of surgical instruments - modern hospitals resemble a large multi-faceted construction site. In the German health care system alone, every day expenses are in the billions. In 2018, the figure was 390.6 billion euros. The weaknesses in the healthcare system are the non-transparent and inefficient processes also caused by a lack of digitalization. This creates mismanagement and strains limited budgets. Above all, the digitalization bottleneck poses a real threat to patient outcomes.

Implementing an IoT platform powered by RFID enables clinicians to effectively use medical equipment and reduce human error in healthcare processes to ensure higher quality of care.

## STERILIZATION AND MANAGEMENT

### **Septic, Dirty, Infected OR Instruments must be sterile**

Every single surgical instrument must be properly sterilized before use. In large hospitals, more than one million surgical instruments and other reusable medical devices pass through the central sterilization process in a year. Reusable surgical instruments and flexible endoscopes are cleaned, disinfected and sterilized. However, if an improperly reprocessed instrument appears in an operating room, the damage is immense. Even if no patient has been directly harmed by contaminated medical devices, entire surgical departments must be immediately shut down for inspection. Legal investigation procedures can take years. Proof of proper sterilization thus becomes decisive information.

### **Process Reliability in the Central Sterile Services Department (CSSD) with RFID**

RFID is used to provide this proof. The ID of an RFID tag on the instrument tray – or directly on the instrument – is married to the information on the number and type of instruments in a management software. Automation and robotics technology ensure that sterilization devices are loaded correctly, that instruments in tray baskets are not stacked on top of each other, and that scissors are open. HID develops special RFID transponders for all sterilization processes. During sterilization, different influences act on the tags: Heat, pressure, humidity, chemical substances or gamma radiation. The tags must therefore not only withstand mechanical stress, but the integrated memories must also withstand exposure to radioactive radiation. For direct attachment or even embedding in medical instruments, there is also the requirement for miniaturization and performance in all-metal environments. With the appropriate tag solution, the reprocessing procedure is documented in a complete and digitally traceable manner.



Special RFID tags are permanently resistant to sterilization influences such as heat, pressure and radiation.

Area of risk: Counterfeit or the multiple use of disposable products endanger human life.

## DEVICE MONITORING AND CONFIGURATION VALIDATION

Less than one percent of all laboratory samples are mixed up. However, the result of the analysis must be 100 percent reliable.

### Patient Safety is Endangered by Counterfeit Accessories

Medical equipment is used for many different procedures, including arthroscopic examinations, operations or aesthetic therapy. Equipped with different components such as filters, tubes or hand pieces, medical professionals adapt the devices to the respective treatment. Whenever accessories are changed, it must first confirm that the parts used are manufacture certified and officially approved. Counterfeit products endanger the health of the treated patients and impair or damage the devices. Secondly, depending on the type of use, it must be ensured that accessories are used exclusively for the treatment of a patient. The third objective is to automatically configure the device by connecting accessories for specific treatments. For example, if a patient moves from the OR initiation to the operating room, the transfer of patient specific parameters from one ventilator to the next must be 100 percent reliable.

### Smart Equipment Accessories

The integration of RFID tags in accessories and consumables meets all three requirements. Reader modules are built into the devices, which automatically check for authenticity when parts are inserted or connected. According to stored settings, the device prohibits reuse if it has been used several times. Devices adopt specific configurations of connected accessories such as operating speeds or pressures.

## INCREASING HAND HYGIENE COMPLIANCE

### Every 4th Hand Disinfection is Omitted

Comprehensive initiatives by hospitals and ministries to promote hand hygiene compliance do not achieve a 100% rate. In a four-year study at the Hanover Medical School (MHH) on the behavioral psychologically optimized promotion of hygienic hand disinfection (PSYGIENE), a compliance rate of 73 percent was achieved. This means: every fourth prescribed hand disinfection was not carried out. An alarming picture when one considers that more than 80 percent of all infections are transmitted via the hands.

### RFID Supports Increase in Compliance Rate

Why is 100% compliance not achieved? The reasons range from the increasing concentration of work in nursing and patient care to the insufficient availability of hygiene products at the point of care. The task is to support doctors and nursing staff in the best possible way in achieving hand hygiene compliance. Technological solutions have the advantage over purely motivational measures in that each necessary hand disinfection is individually controlled. Employees are registered at disinfectant dispensers via an RFID wristband or their RFID-enabled employee ID card. If disinfectant is not dispensed, a sound signal is emitted. RFID-based solutions in combination with patient-oriented placement of disinfectant dispensers are effective components to increase the disinfection rate and prevent cross-contamination.



Hand hygiene is essential: more than 80 percent of all infections are transmitted via the hands.

## FLAWLESS HANDLING IN THE LABORATORY

### **Objective: 100% Avoidance of Mix-Ups**

Blood collection, smear or sputum tubes, PCR tubes, sample and microscope slides, petri dishes and handling equipment such as pipettes and trays – countless individual parts are moved around in a laboratory every day. The handling of blood and tissue samples is error-prone, despite prescribed, complex documentation and extensive safety precautions. Mix-ups occur or samples become unusable due to improper handling or manipulation. Widespread visual identification solutions and manual hand entries are time-consuming. Process automation is only possible in some areas. RFID transponders on sample racks or directly on sample containers ensure unique identification. Data acquisition is still possible with process reliability even if optically readable labels or imprints are no longer legible due to the influence of low temperatures, heat or chemicals.

An additional area for the use of RFID technology in laboratories is the tagging of instruments and laboratory equipment. Pipettes can be assigned to the examined samples as well as slides for microscopic examinations. It is also possible to control laboratory programs via RFID: If tagged samples are recorded with an antenna integrated in the work surface, a display shows the corresponding examination orders and processing steps. The recording ensures that sample analysis is carried out in the prescribed processing steps. No step can be skipped.

## IDENTIFY, LOCATE AND TRACK ASSETS

### **Where is the Portable Ultrasound Device when you need it?**

IV pumps, dialysis machines, patient monitors, ultrasound equipment, or any portable medical equipment, in addition to beds and wheelchairs – hospitals contain hundreds of thousands of medical devices. In Europe, a large proportion of these products are subject to a safety control regulation. The assessment must take place regularly depending on device application. In the case of mobile or portable devices, the ability to find the device quickly for patient care is also essential. Depending on the type of product – if they only encounter the surface of the patient's skin or with mucous membranes and wounds – reprocessing rules must be adhered to. All inspection work, test and measurement results are documented in the medical device book. The operating times of the devices must be fully traceable for internal biomed audits and external billing purposes.

### **RFID Resolves Complexity**

With RFID identification and a suitable IT solution, the complexity of documentation and transparency requirements is resolved. Tagged assets that are used for patient treatment, care and support are mapped in the hospital information system in terms of IT. The automatic documentation of usage times, preparations and clean room checks as well as localization in real time relieves employees of time-consuming tasks, ensures patient care and supports cost-efficient hospital management.

Hospitals with more than 1000 beds contain 200,000 or more medical devices. In Europe, the majority of these products are subject to a regulation on safety control.

Opioids such as fentanyl are used for the acute care of more than 18,000 seriously injured patients in Germany every year.

## NARCOTICS DIGITALLY REGISTERED

### Access to Acute Medicine Secured Twice

If RFID tag developments are transferred to new applications, the ROI is accelerated. A striking example is an OEM product that supports the acute care of severely injured people in ambulances today. Originally, the UHF RFID transponder “Seal Tag edTamper” integrated in this solution was developed by HID for testing the presence of life jackets in aircraft. The tag makes manipulations digitally visible. Using a handheld reader, the tag can be verified up to two meters whether the seal has been opened or broken.



A company in the United States uses this function to detect opened seals to secure narcotic containers. The seal tag is integrated into the cap of the drug container. As soon as the screw cap is opened, the RFID seal also opens. The evidence is transmitted via the UHF interface of the tag. The exact time is documented and access to the containers is restricted to authorized personnel. The solution includes a secure medicine safe with an integrated UHF reader module that checks the integrity of the set container racks. Access to the safe is secured with an RFID enabled lock. Each access is documented. By using RFID badges for personnel and RFID seals for containers, highly effective medicines are secured twice over.

## IDENTIFY, LOCATE AND TRACK ASSETS

### Where is the Portable Ultrasound Device when you need it?

IV pumps, dialysis machines, patient monitors, ultrasound equipment, or any portable medical equipment, in addition to beds and wheelchairs – hospitals contain hundreds of thousands of medical devices. In Europe, a large proportion of these products are subject to a safety control regulation. The assessment must take place regularly depending on device application. In the case of mobile or portable devices, the ability to find the device quickly for patient care is also essential. Depending on the type of product – if they only encounter the surface of the patient's skin or with mucous membranes and wounds – reprocessing rules must be adhered to. All inspection work, test and measurement results are documented in the medical device book. The operating times of the devices must be fully traceable for internal biomed audits and external billing purposes.

### Conclusion

There are many medical applications that benefit from using RFID technology. As demonstrated, digitization reduces human error or manual processes to comply with many industry regulations, automate device configuration for safe and improved performance and reduce risk of cross-contamination — achieving best patient care throughout the facility.

For more information, email HID at [tagsales@hidglobal.com](mailto:tagsales@hidglobal.com) or visit [hid.gl/medical\\_devices](http://hid.gl/medical_devices)



hidglobal.com

North America: +1 512 776 9000 | Toll Free: 1 800 237 7769  
Europe, Middle East, Africa: +44 1440 714 850  
Asia Pacific: +852 3160 9800 | Latin America: +52 (55) 9171-1108

**For more global phone numbers click here**

© 2021 HID Global Corporation/ASSA ABLÖY AB. All rights reserved.  
2021-07-21-idt-medical-rfid-solutions-wp-en PLT-05378  
Part of ASSA ABLÖY