

APPLICATION OF UNIQUE DEVICE IDENTIFICATION SYSTEM -
REALIZE ARTIFICIAL INTELLIGENCE INTELLIGENT MANAGEMENT
OF SURGICAL MEDICAL MATERIALS

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Introduction

Operating room is one of the most resource-intensive and high-cost departments in the hospital. However, the complexity of the operation process, such as improper charging of medical materials or implantation of defective medical materials, may lead to increase the operating cost and occurrence of medical errors of the hospital. According to Mckinsey's (2017) research, the digital transformation of operating procedures can reduce medical errors. The Unique Device Identification (UDI) system can not only improve the accuracy of surgical medical materials charge. It ensures that the date labeling of medical equipment has a uniform standard format, and effectively detects and prevents counterfeit medical equipment products. This system also avoids user confusion, reduces medical personnel misusing, and improves the safety of medical equipment for surgical implants. We hypothesis that the introduction of automatic identification aids in the operating room will improve the accuracy of medical material charge and information sharing, reducing time costs, and improving the safety of medical materials used by patients during surgery (U.S. Food and Drug Administration Authority, 2018).

Methods

1. Implantable medical material management: Establish a charge operation process for implantable medical materials by using the unique orthopedics, neurosurgery identifier system, and introduce the UDI system in all surgical departments. The surgical departments will be divided into four groups. The first group is: ophthalmology, and the second group is: general Surgery, plastic surgery, colorectal surgery, thoracic surgery, the third group: obstetrics and gynecology, urology, otolaryngology, other departments, the fourth group: orthopedics, neurosurgery.
2. General medical material management: According to the characteristics of each department, the charge items are established in the UDI system, and 447 charge items are created, and the operating room cashier system is connected to the system. When the surgical operation is finished, one-click send immediately to the system without delayed.
3. Connect the UDI system with the surgical recording system: When using surgical implant medical materials, the system can automatically record the product name, specification, model, batch number, and quantity, reducing manual entry time and the occurrence of entry errors.
4. Build an automatic charging and inventory deduction system for medical materials: After the medical materials are used, the system can automatically deduct in the warehouse, transfer the order to notify the manufacturer to deliver the goods, and assist in counting the quantity. This system replaces manual counting operations, and improve inventory counting management. It avoids shortage of medical materials or excessive storage.

Surgical Departments	
Frst Group	Ophthalmology
Second group	General Surgery, Plastic Surgery, Colorectal Surgery, Thoracic Surgery
Third group	Obstetrics and Gynecology, Urology, Otolaryngology, other departments
Fourth group	Orthopedics, Neurosurgery

簡化流程提高效率	
套餐模式	單選模式
已選取之計價衛材品項	匯入

降低紀錄誤植錯誤	
UDI系統刷入植入物資訊	系統匯入
手術護理植入物紀錄	匯入

Results

1. The number of "abnormal charges for surgical medical materials" has dropped from 26cases per month to 3 cases per month.
2. "Completeness rate of surgical implant medical materials records" increased from 81.6% to 100%.
3. We established the operation process of "recall of defective implanted medical materials".
4. The charging of medical materials in the operating room is fully electronic, reducing the amount of paper used by about 22,000 sheets per year.

Conclusion

Unique Device Identification (UDI) systems improved surgical safety for patients and reduced healthcare costs. Furthermore, this operation process also fulfilled environmental protection and social responsibility, which are crucial to the sustainable operation of the hospital.

Keywords: Artificial intelligence, surgical medical materials, Unique Device Identification System,