# Storage and dispensing robotization. What system to implement?

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## Purpose:

To analyze two storage and dispensing automation systems in order to make a decision to improve the safety, efficiency and quality in medicine use in our hospital.

## Materials and Methods

Review of two systems: A) fully integrated robotic automation (fully enclosed storage modules that automatically generate individual dosage units-DU- grouped into rings per patient), and B) system with different components (semi-automatic storage and cart-filling system, plus storage tanks filling, automatic dispensing systems (DAS) in inpatient units, plus outpatient visit robotization and repackaging). We analyse the resources currently available and the benefits of both systems. DU consumed in 2011 are studied and classified by pharmaceutical form, volume, storage conditions and based on whether they are dispensable to outpatients or not. High volume solutions and enteral nutrition are excluded. The costs used in the analysis are the sum of the quotes received from suppliers, excluding maintenance costs. The same level of human resources is assumed. Costs are expressed as additional costs per number of DU dispensed under each system.

## Results:

16.213.352 DU were dispensed in 2011 in connection with 2971 drugs (40% are dispensable to outpatients). Advantages and disadvantages of both systems are listed in Table

| Advantages and disvantages of both systems | | |
|---|---|---|
| | **System A** | **System B** |
| **SAFETY** | Possibility that all DU are univocally identified with batch expiry date<br>Completer record, including batch, administration by scanner<br>Closed system | Partial identification with batch barcode and expiry date<br>Record drug administration with bar code without batch<br>Partially open systems, error risks |
| **EFFICIENCY** | Entire integrated system including outpatients and elderly residences<br>Full return unmanaged DU<br>Allows automatic ontrol of expiration date<br>High cost | Inmediate availability on nursery doses needed to the patient<br><br>Full expiration date control is difficult<br>High cost |
| **QUALITY** | Complete record of all movements both drugs as users | Partial registration of users, batches, drugs in drug use chain |
| **Additional cost Du(euros)** | 0,19 | 0,20 |

## Conclusions:

The integrated robotics system (system A) appears to be a safer, more versatile, and more efficient system providing more information than system B, which provides greater accessibility for nursing. The cost analysis is slightly favorable to system A. One limitation of the study is that the costs of maintenance and the required human resources reengineering need to be further expored.