OPTIMISING THE SUPPLY CHAIN OF MEDICAL DEVICES: PHARMACEUTICAL CLASSIFICATION AND QUALITY MANAGEMENT

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Introduction

The CHU Ibn Rochd Casablanca has a functional litter capacity of 1600 beds. It is composed of 4 hospitals: Ibn Rochd Hospital, Hospital 20 Août, Children's Hospital and Dental Advisory Center. The present work is carried out at the pharmacy of Ibn Rochd Hospital. This pharmacy is in charge to provide pharmaceutical products for more than 46 care units which represents 75% of the CHU activity. In the current organization hospital chart, pharmacy is considered as a unit of the supply department. So that, up to now, It is managed formally by an economical administrator. Recently, four pharmacists have been allocated. Their tasks are divided between management of anticancer medicines, other medicines, fungibles, medical and pharmaceutical accessories, surgical sutures and radiology products.

In Ibn Rochd Hospital, the medical devices budget accounts 45% of total budget allocated to pharmaceutical products (medicines and medical devices). In common practice, the term "medical devices" has never been used in public procurement procedures nor computer software. It has been declined in 3 terms called "headings":
- Medical and Pharmaceutical Accessories (abbreviated PAMP in French);
- Ligatures for all surgical sutures;
- Fungibles for all other medical devices belonging to the four European classes (I, IIa, IIb and III) as defined by Directive 93/42/EEC.

In this context, we have noticed that most sudden shortages and expiration of medical devices are due to storage dysfunction. Hence, interest of the present poster.

Objectives

To present storage stores superficies then classify medical devices by panels based on two principles: 1-building a storage mapping related to risk-based classification 2-implementing progressively quality management system by adopting storage mapping with article codes.

Methods

The storage stores superficies are calculated through development plans. To classify and organize medical devices two programs are used: Microsoft EXCEL 2010 and ARCHICAD19.

Dimensions of secondary and tertiary packaging of each medical device, shelves and storage pallets are measured using a tape measure

Other parameters are calculated: packaging volume, average monthly consumption, volume of average monthly storage and Available storage space in months, the Effective Storage Capacity (ESC) of each storage store.

Results

The superficy of medical devices storage store is calculated as it is mentioned in Figure 1 and Figure 2. The first floor contains 174 shelves as it is shown in Figure 2.

520 articles of medical devices have been classified and organized in fourteen medical specialties "panels“. Their distribution is presented in: Figure 3 - Figure 4 - Figure 5.

Storage capacities of:
▪Shelves (Figure 7) :**1.6731 m³,1.7721 m³, 2.1681 m³ ,2.3661 m³**
▪Pallet (Figure 8) :**2,1312 m³**

The volume of each package is deduced from their dimensions which is the following :
▪Maximum volume : **146850 cm³**
▪Minimum volume : **992 cm³**

The condition of stores after the classification of medical devices (Figure 6)**:**

▪ Fungibles storage stores contains 176 pallets and 100 shelves **:** ESC = **552.2022m³**

▪ PAMP storage store contains 119 pallets and 53 shelves **:** ESC = **359.8101 m³**

▪ Surgical sutures storage store contains 21 shelves **:** ESC = **38.60 m³**

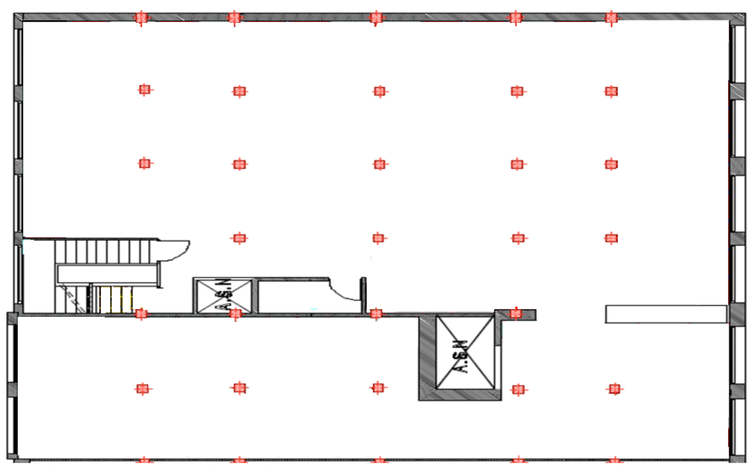

Figure 1. Plan of medical devices storage store in the basement area (Superficy : 385 m²)

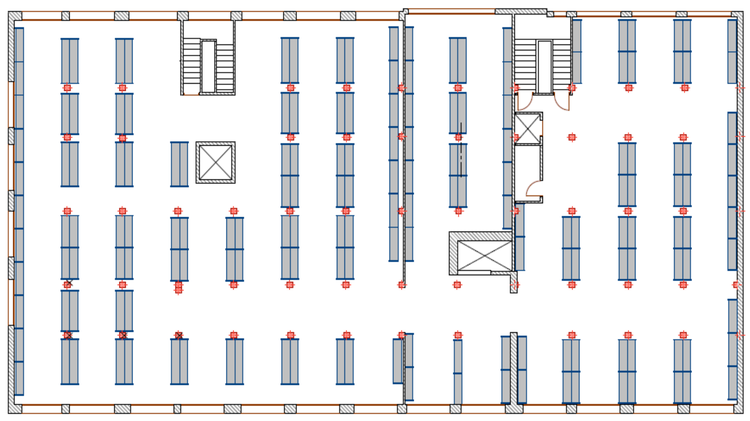

Figure 2. Plan of medical devices storage store on the first floor (Superficy : 835 m²)

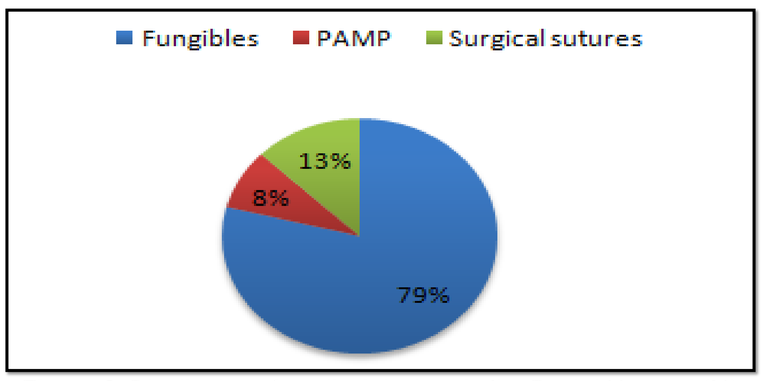

Figure 3. Distribution of medical devices in Ibn Rochd Hospital (%) (Denominator: total number of medical devices = 520 articles)

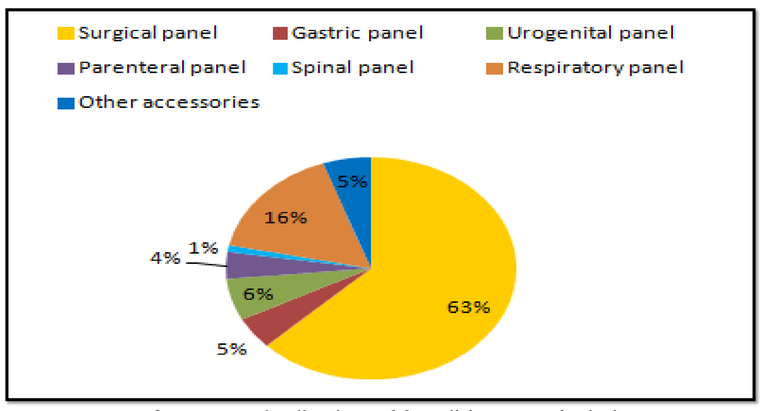

Figure 4. Distribution of fungibles panels (%) (Denominator: total number of fungibles = 411 articles)

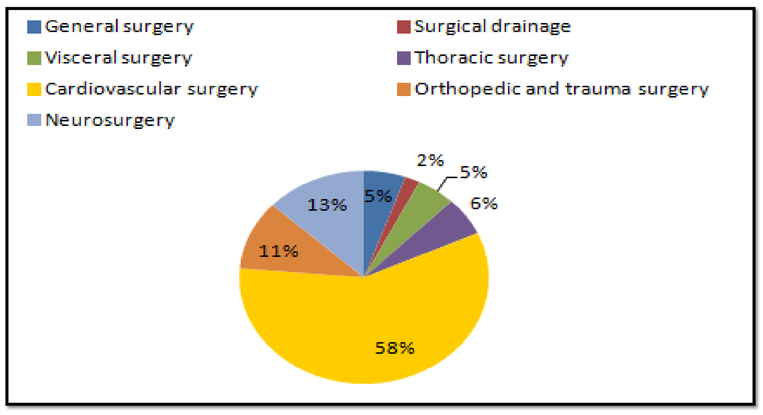

Figure 5. Distribution of surgical panel subtypes (%) (Denominator: number of articles in surgical panel = 258 articles)

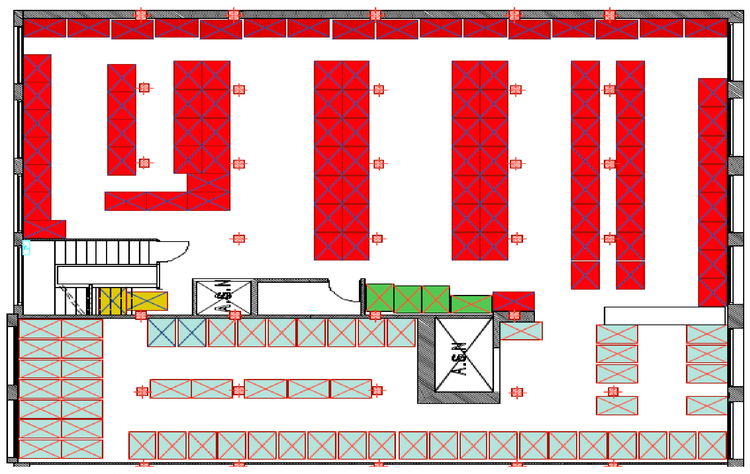

Figure 6 . Storage mapping related to risk-based classification of medical devices panels in the basement area

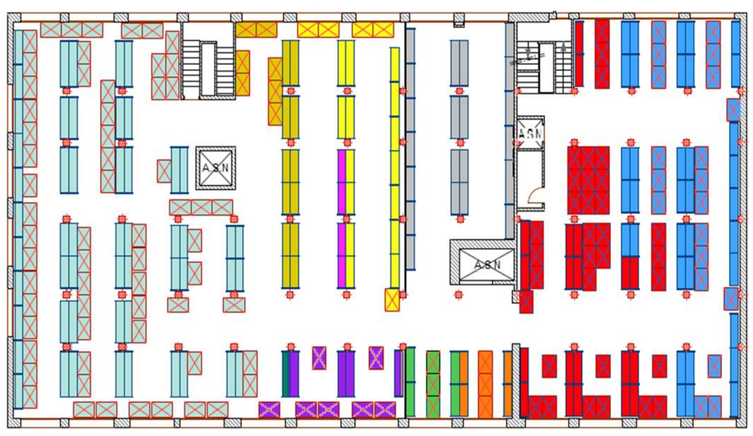

Figure 7. Storage mapping related to risk-based classification of medical devices panels in the first floor

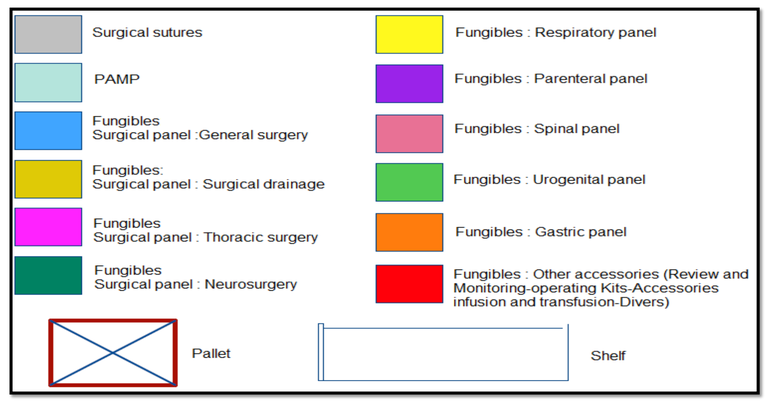

Figure 8. Color legend of medical devices storage mapping

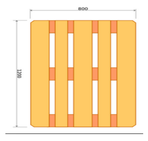

Figure 9. Pallet schema

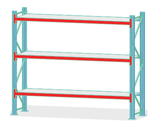

Figure 10. Shelf schema

Panel	A	B	C	D
PAMP	301.34	33.19	10.58	100.00
Surgical sutures	3.71	0.29	132.58	100.00
Surgical panel : General surgery	97.15	4.76	22.54	21.10
Surgical panel : Surgical drainage	23.16	2.67	15.95	7.50
Surgical panel : Thoracic surgery	25.44	0.13	58.57	1.20
Surgical panel :Neurosurgery	5.1	0.051	23.53	0.30
Parenteral panel	73.45	1.73	18.88	4.40
Spinal panel	0.51	0.21	23.53	0.10
Respiratory panel	21.12	1.30	27.1	7.00
Gastric panel	34.51	0.44	39,90	2.40
Urogenital panel	16.2	1.21	16.41	4.30
Other accessories	372.85	29.20	15.83	51.60

Figure 11. Parameters calculated to optimize medical devices storage mapping

Legend :
A : Average monthly consumption in packages number
B : Average monthly storage in volume (m³)
C : Available storage space in months
D : Volume of the panel in percentage (%)

Discussion

Fungibles account for almost 80% of the total number of medical devices. Concerning fungibles subtypes, 58% are used only in cardiovascular surgery, followed by general surgery (13%), and traumatology-orthopedics (11%).

All fungal subtypes can be stored for 15 months or even longer. The surgical sutures storage do not pose a problem. However, for PAMPs, although it represents only 8%, storage stores can not store beyond 10 months of their AMC. This means that there are 5 AMC of PAMP that still pose a problem. After analyzing the management defects of PAMP, we identified the main constraints:

1- Quantitative and qualitative needs are rising year to year;

2- The special conditions clauses (CPS in French) of CHU Ibn Rochd Casablanca require that each supplier delivers the total quantity awarded within a period does not exceed 90 days since the date of contract notification. This condition means that 3 months after contract notification, pharmacy stores are supposed to store all medical devices covering 15 months at once. This causes storage problems especially for PAMP;

3- The absence of Quality Management System (QMS) caused a mess. For one specific medical device, it can be randomly stored in “available space”, so the stock could be split into 2 or even 3 parts. To address this problem, a codification project of all storage spaces (pallets and shelves) is in progress. This project aims to edit storage mapping with article codes. The storage mapping is essentially based on risk-based classification of medical devices and their medical specialty panels (FDA classification). In the event of a change due to storage obligation despite lack of storage space and until changing CPS clauses of CHU Ibn Rochd Casablanca, periodic posting of updated lists of medical devices encompassing their coded positions in storage mapping will be also implemented.

4-The software currently used is archaic because it does not trigger alert in case of stockout nor if expiry dates approach. To address this problem, several meetings were organized with the SI division. An IT solution is proposed for pharmaceutical management. The tender process will be launched in 2017.

Conclusion

Supply chain management of medical devices is one of the main functions of the pharmacy department. The new classification adopted in storage mapping is expected to : -facilitate medical devices localization, -provide a better space management, -decrease problems related to sudden shortages, -eliminate products that expire just because they were forgotten somewhere in storage stores, -provide a rationalized use, -accelerate the implementation of QMS soon by editing quality documents such as pharmacy processes, operational and organizational procedures, operating modes, Quality Manual -limit dependency on staff after implementation of QMS.