

# To a failure analysis of the pharmaceutical supply system in Morocco

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**Abstract** - *In Morocco, in the context of current reforms of the health ministry that targeted the establishment of basic medical cover (AMO RAMEE ...), A great effort is made to improve the availability of pharmaceutical products (FP) and promote their use. Including the increase in the budget allocated to their acquisition which increased from 300 million dirhams in 2003 to 2.2 billion dirhams in 2013. But whatever the mode of funding, the needs of the population in pharmaceutical products cannot be covered without effective and efficient management approach. Experience shows that it is possible to improve access to these products for the population by making the best use of resources and streamlining management processes. In this present article, we will focus on the description and analysis of the supply system of pharmaceuticals in Morocco, based on the literature to suggest areas for improvement.*

**Key Words:** *pharmaceutical product, logistics cycle, supply system, public hospital, failures*

## 1. INTRODUCTION

With the establishment of basic medical coverage, including the AMO and RAMEE, public hospitals must meet a demand for care increasingly important and face a population become more demanding. For this reason and given that medicines and medical goods alone absorbs 31.7% of overall health expenditure, the Ministry of Health has made considerable efforts to ensure their availability, facilitate accessibility and reduce household contributions in the purchase of these drugs especially at the hospital level. Among these efforts [1]:

- The development of a national list of essential drugs and medical devices (vital and expensive), allowing a better supply with a cheaper cost and more rational prescription;

- The increased purchasing budget of drugs and medical devices over 78% (2.2 billion dirhams in 2013);

The appropriation of pharmacists in peripheral hospitals;

- Repositioning of pharmacy service as a service directly related to management and managed by a pharmacist;

- The implementation of the drug committees and medical devices;

- Standardizing and upgrading hospital pharmacies;

Despite these efforts, the patient still complains and does not take full advantage.

In the literature, there are several authors who have dealt with this issue and tried to contribute to improving the availability of pharmaceuticals in hospitals:

[2] Focused on the downstream chain of pharmaceutical consumables. The author has modeled the strategic and tactical levels by the SCOR model and simulation of the operational level by the ARIS tool. The objective is to compare the structure and management of centralized and decentralized decision of the downstream pharmaceutical supply chain. The results selected by the simulation models show that the centralized approach is more efficient from a global point of view but that earnings distribution mechanism is needed.

[3] Treated the issue of the performance of the logistics processes of public hospitals by the proposal of a scoreboard for the control of supplies from the pharmacy of a Moroccan public hospital.

[4] Proposes the modeling process by the norm ISO hospital with the aim to reorganize the process of distribution of pharmaceuticals and analysis in pharmaceutical supply chain performance.

[5] Presented as part of his doctoral thesis simulation models describing the operation of a French hospital pharmacy using the tool ARIS and then proposes to test scenarios for improvement using SIMULA and WITNESS tools. The author was able to optimize inventory in drugs and human resources available through simulation models obtained.

[6] Proposed initially the overall analysis of drug circuit by Business Process Management approach then develop finer patterns by using a generic model of knowledge based on a UML coupling network and kneaded, and then a simulation by Arena. The aim is to contribute to improving the performance of drugs of the circuit in a university hospital in MOROCCO.

In this present article, we will focus on the description and analysis of the supply system of pharmaceuticals in Morocco, based on the literature to suggest areas for improvement.

## 2. HISTORY OF PHARMACEUTICAL SUPPLY SYSTEM IN MOROCCO

The supply system of pharmaceuticals in Morocco has had for 35 years 6 times change system turn centralized or decentralized role [7] and [8] (Figure.1);

So, the current supply system for pharmaceutical products is done exclusively by the division of procurement under the General Secretariat of the Ministry of Health.

The budgets allocated to the purchase of pharmaceutical products by the Ministry of Health are of the order of 2 billion dirhams annually. This budget has increased dramatically since the last 12 years since the 2003 budget did not exceed 300 million dirhams. [8]

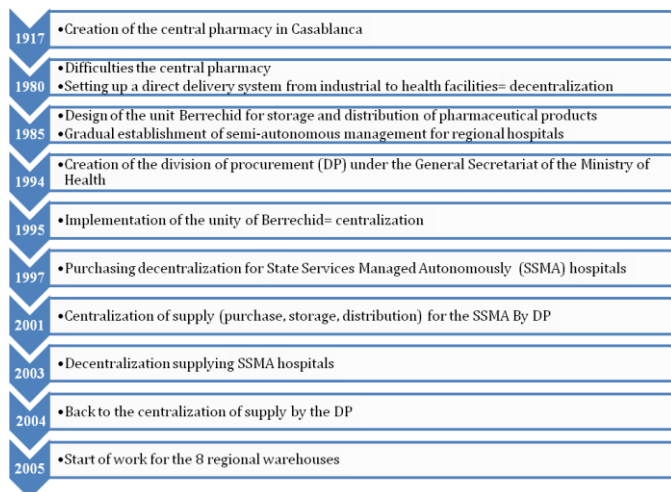


Fig -1: Historic PF supply system in Morocco

## 3. MAPPING SYSTEM SUPPLY AND DISTRIBUTION OF PHARMACEUTICAL PRODUCTS

The publicly available data and literature review allowed us to develop a macroscopic pattern called mapping to describe the supply and distribution systems for pharmaceutical products in Morocco (Figure .2).

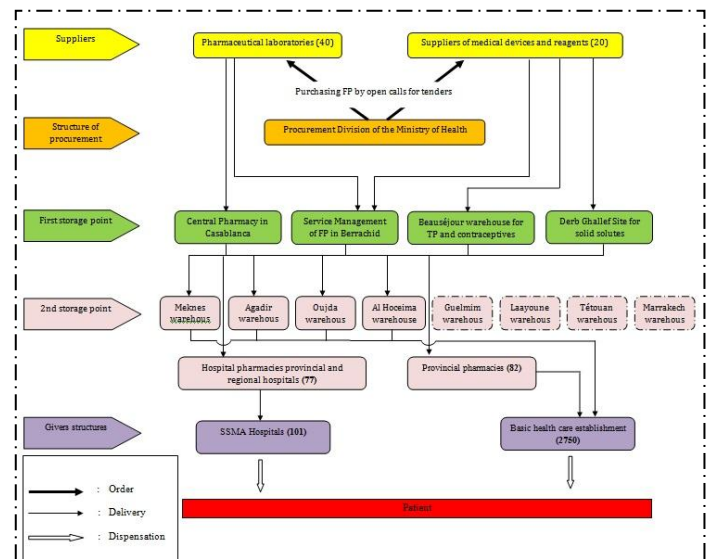


Fig -2: Mapping of the supply system and distribution of pharmaceutical products in Morocco

Figure 2 shows a map of the actors in the supply and distribution of Pharmaceutical Products in Morocco: The Procurement Division (PD) of the Ministry of Health launches tenders for procurement of pharmaceuticals (drugs and devices medical) with pharmaceutical laboratories which are 40 in number and supplier of medical devices and reagents which number 20 .These suppliers deliver directly to the storage point 1, consisting of 4 central depots (Central Pharmacy in Casablanca ,Service Management of FP in Berrachid, Beauséjour warehouse for thermolabile products and contraceptives, and Derb Ghallef Site for solid solutes) that distribute pharmaceuticals from side to regional warehouses of 8 including 4 completed (Meknes, Agadir, Oujda and Al Hoceima ) and 4 under construction or at the planning stage (Tetouan, Marrakech and Guelmim Laayoune), the start of work started in 2005 currently play no role in the procurement cycle or are used as provincial and pharmacies On the other hand the hospital pharmacies provincial and regional hospitals that supply State Services Managed Autonomously (SSMA) hospitals and provincial pharmacies provincial delegations that deliver basic health care facilities (BHCF) to the end provide the end customer who is the patient.

One can add to these players:  
 -The Department of Planning and Financial Resources (DPFR), which shall notify the PD programmed budgets under the current year and then delegate the necessary funds to market engagement;  
 -The Directorate of Population (DP) and the Directorate of Epidemiology and the Fight Disease (DEFD) who develop controls on public health programs in consultation with the actors at the regional level and transmit them to the PD to be acquired and distributed;

- The Directorate of Medicines and Pharmacy (DMP), which provides the control function (Down granting of the Marketing Authorisation) and quality control (sample analysis through the National Laboratory of Drug Control).

#### 4. CYCLE SUPPLY PHARMACEUTICALS

The procurement cycle in pharmaceuticals mainly includes five steps: selection, quantification, procurement, supply and use (Figure.3).

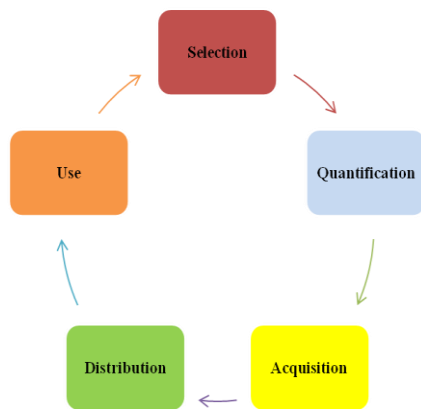


Fig -3: Cycle supply pharmaceuticals

Source : [9] adapted

##### ✚ Selection:

The selection of pharmaceutical products is made from the national list of essential drugs (NLED) by an operating committee that is organized with the objective to make a qualitative selection of pharmaceutical product where each service shall select the products that it deems necessary to the care of patients. The NLED in Morocco is prepared by the Directorate of hospitals and outpatient care, in collaboration with the Division of Supply, the medication management and pharmacy, revised annually and sent annually by the Division of supply to hospitals public.

##### ✚ Quantification :

Quantifying pharmaceutical needs is done at each service so the estimated hospital. The medical profession does not help in this selection should be the main concern, leaving this be done by nursing leaders who are content with a mere renewal. Then the pharmacist brings together the needs of different services in a single order and recalculates the total amount. When it exceeds the budget allocation to the hospital, appropriate adjustments are made. The final list of products is subsequently subjected to the assessment of medicines for validation committee. Finally the order form is returned to the Supply Division. [1].

##### ✚ Acquisition :

The acquisition of pharmaceuticals is done exclusively by the division of supply. So the PF are purchased from

domestic suppliers, except for the purchase of vaccines to UNICEF. The acquisition is through the launch of tenders pursuant to the provisions of Decree No. 2-12-349 of 08 Jumada I 1434 (20 March 2013) on public procurement. Centralized purchasing FP allows a huge gain in terms of financial resources.

##### ✚ Distribution :

The division supplies the provincial health delegations (which themselves supply the hospitals and health centers governed) and hospitals SSMA. Hospitals can buy medicines locally in a 400 000.00 DH ceiling. This budget is initially reserved for the purchase of emergency medications and those who are not on the nomenclature sent by the division of supply. However, the five university hospitals in Rabat, Casablanca, Fes, Marrakech and Oujda which are institutions with administrative and financial autonomy are supplied separately (except occasionally for emergency replenishment, which If the products are "loaned").

The distribution of pharmaceutical products by the DA is currently limited to deliver these to 159 provincial and hospital pharmacies. Distribution to basic health care establishments and hospitals attached to provincial hospitals and regional hospitals is through the means of each delegation or hospital. Deliveries are made by the DA in a planned way with typically 4 deliveries per year. The annual volume of stored and distributed pharmaceuticals currently around 25,000 tons. The distance for the distribution of pharmaceutical products is about 700,000 km yearly (not including delivery between delegations and BHCf) [8]. Note that in addition to the means of transport fit for DA, drug transport is also provided by two national operators (SNTL and Barid Al Maghrib). The amount dedicated annually for that subcontracting is 10.38 million Dhs.

##### ✚ Use :

It is essential that the right drug is made by the right patient at the right time, in the right quantity and in the right way, for an adequate duration and with the necessary precautions. The hospital pharmacy delivers pharmaceuticals to care services. The use of drugs is a process managed by the care unit and includes prescribing, dispensing, and administration [10]. The prescription: is a process that includes various steps of defining the nature of the patient's problem (diagnosis), define the effective and safe treatment (medication or not), choose the appropriate drugs, their doses and duration of administration, writing prescription, give patients adequate information and plan the evaluation of the response to prescribed treatments [11].

The registered individual dispensation: Is to deliver medicines to a patient with a prescription that has the name, admission number, product name, and dosage, treatment duration, dated and signed by the attending physician.

**Administration:** This is the last step of the medication circuit, necessarily follows the stages of prescribing and dispensing. It is at this stage that all potential risks generated in the stages of prescribing and dispensing may take the form of medication errors proved.

**5. ANALYSIS SYSTEM SUPPLY PHARMACEUTICALS IN MOROCCO**

The survey conducted in the emergency department of the IBN SINA hospital in Rabat showed that a drug prescribed five, was not available or because of a stock shortage at the hospital is due to inadequate staffing resulting in intermittent breaks in stock at the emergency department. Consequently, only 61% of patients received all the prescribed drugs [12].

Hospitals in Morocco do not escape this situation of shortage of pharmaceuticals. According to [13] "the lack of pharmaceuticals in health care systems can block any operation care from a health facility."

A decrease in the coverage of needs in drug patients, seriously damaging the quality of care and causes patient dissatisfaction attending public hospitals and health centers.

WHO defines four goals at a good system of supply management of pharmaceuticals [14]:

1. Acquire the drugs with the most cost / effective in the right quantities.

2. Select reliable suppliers of high quality products.

3. Ensure that deliveries are made on time.

4. Ensure the total cost as low as possible.

An effective supply management is the one that guarantees the availability of products at the service of the care act in quantity and at the right time. The desired amount does not mean the abundance of products. In other words, this is just to supply the necessary quantity at the appropriate time. We can therefore deduce two major malfunctions that may affect a PF of supply management processes that are breaking and overstock.

The availability of pharmaceutical products is the result of the performance of the supply system but also from suppliers and recipients who place their orders [7].

To improve the availability of pharmaceuticals within hospitals, we must act on the PF management process from selection to the administration while involving the entire hospital professionals (especially medical staff) in the management of the drugs.

Thus, to trace the causes of the unavailability of a pharmaceutical product to the care unit at time t, we have classified the causes into 3 categories: Organizational, human and technical drawing on literature (Table.1).

**Table -1:** Causes of non availability of FP in public hospitals

	<b>Organizational</b>	<b>Human</b>	<b>Technical</b>
<b>Selection</b>	- The absence of the support of all stakeholders in drug selection - Lack of awareness of drug prescribers management	lack of qualification of the selection committee	
<b>Quantification</b>	-Bad estimate of needs regimens and statistics on consumption and the actual use of drugs. -the non involvement of medical personnel in the estimation of drug needs.	wrong inventory	Absence of a computer application at the pharmacy
<b>Acquisition</b>	-No respect of hospital orders -the percentage of single bidder batches exceed two thirds, up to 88% of all drugs purchased -Local For tender unsuccessful due to lack of bidders especially for small batch sizes and cumbersome administrative procedures		the effectiveness of the ministry information system. Whether it's for monitoring the supply of pharmaceutical products for inventory management or for control

<b>Distribution/ Stock management</b>	<ul style="list-style-type: none"> <li>- absence of a schedule of delivery of drugs by the central pharmacy</li> <li>-The Minimum and maximum inventory of each item are not determined, and the safety stock</li> </ul>	<ul style="list-style-type: none"> <li>-Lack Of qualified human resources for the management of stock in the central warehouses</li> </ul>	<ul style="list-style-type: none"> <li>-Place Storage is small or inadequate</li> <li>-Lack Of housekeeping</li> <li>-No Respect to storage conditions</li> <li>insufficient media</li> <li>-aging infrastructure and equipment in the central pharmacy</li> <li>- System information not suitable</li> </ul>
<b>Use</b>	<ul style="list-style-type: none"> <li>- Inappropriate prescribing,</li> <li>- Noncompliance of recommendations</li> <li>-Risk of misunderstanding, and forgets errors in medication administration when it is based on a verbal prescription</li> </ul>	<ul style="list-style-type: none"> <li>-Lack of rigor in stock management in care units</li> </ul>	<ul style="list-style-type: none"> <li>-33 / 122 hospitals do not have the cooler, which increases the risk of damage or loss medication.</li> </ul>

From Table 1, we see that the non-exhaustive causes of non availability of pharmaceutical products are mainly in .This organizational and technical level are internal and external causes to the public hospital, knowing that they are linked, thus eliminating a number of the major causes leading to the automatic neutralization of other causes related thereto.

Based on best practices of supply management we will suggest improvement actions to address the causes of the unavailability of a pharmaceutical product at a given time throughout the FP management process from selection to the administration:

**✚ Selection**

- Provide ongoing training in management of pharmaceutical products for the caregiver,
- Raise awareness and involve all prescribers for the selection of pharmaceutical products for better assessment of actual needs.

**✚ Quantification :**

- The lack of a hospital information system leads to a poor estimate of the needs of hospitals, consequently either be with an inventory buildup in pharmaceuticals which may cause the shelf life of these products, or rupture drug and is the most common case. And computerization of hospitals and pharmacies delegations is needed via the installation of an integrated information system in

provincial and regional hospitals on one side and the other side in provincial delegations to complementarity and coordination in terms of stock management when needed. Its implementation is based on the development of consumer cards, order records, history files, and proper keeping of stock sheets. It automates procedures and provide information types: status display real-time inventory tracking inventory in the store (aisle, row, rack ...), automatic replenishment process into account the minimum quantity to have in stock, the quantity reserved by programmed procedures, but unrealized, of the amount not already received order.

- Involve the medical staff in the estimation of drug needs.
- Develop treatment protocols in consultation with all prescribers.

**✚ Acquisition :**

The centralization of purchases by the division of supply unquestionably enables lower prices: larger quantities purchased for the same market, delivery Berrachid (30 km from Casablanca where suppliers are located). Despite this, in certain tenders, the percentage of single bidder batches exceed two thirds, up to 88% of all drugs purchased, and in other cases, there are calls for tenders unsuccessful, or lack bidder above the small size of lots and cumbersome administrative procedures do not encourage suppliers to meet for small lots, and they prefer to wait for a direct negotiation, or by either rejecting offers that do not respect requirements in the SPC. And to reduce the number of unsuccessful batches and accelerate the process of acquisition, the division supplies must resort to restricted tenders for products with only one provider in Morocco .A evaluation grid suppliers to consider to arrive at a short list of suppliers with satisfactory for several years (no technical problems, cooperation to address problems encountered) and limiting requirements vis-a-vis these suppliers. Less systematic and less frequent checks will be made with the objective of basing purchases on trust.

**✚ Distribution / Stock management:**

- Strengthening the team by pharmacy staff allocation.
- Distribute pharmaceuticals hospital services according to a predetermined delivery schedule and disseminated to clinical services.
- Improve the storage of drugs, for the redevelopment of the premises, the development of storage procedures, and make systematic inventories.

**✚ Use :**

- Make available to all prescribers list of available drugs to hospital pharmacy in easy to view, and display the updated list in all services.
- To reduce the risk of damage or loss of drugs in hospitals, we must equip them in cold rooms or refrigerated cabinets and control their temperature especially for labile products.

## 6. CONCLUSIONS

In this article, we have described the system of supply and distribution of pharmaceutical products through a mapping and the different actors involved in the pharmaceutical supply cycle in Morocco. Then we analyzed the system. Finally we have proposed action to improve the availability of pharmaceuticals in Morocco. This research is just the beginning; there is a field study that will involve a detailed assessment of supply and distribution system for pharmaceuticals in Morocco.

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