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# RESEARCH ARTICLE

## HOSPITAL LOGISTICS TRACEABILITY: INTERNAL MEDICATION MANAGEMENT PROCESS

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**ABSTRACT**

Medicine has become an essential object to the life of people in any country, because of the serious, chronic diseases and even pain associated with headaches, tension and fatigue. It is even a major health, regulatory and economic issue for healthcare institutions, the methods of managing, distributing and controlling these medicines differed from one company to another according to the strategies and means used in the manufacturing process. Considering that the reorganization of supply chain management is necessary in order to meet the objectives of securing the medicine circuit and rationalizing healthcare expenses. This makes it possible to control the management of medicines at the level of the normal logistic chain. We have made a state-of-the-art stock management and internal hospital traceability, while trying to develop a suitable relationship between the hospital sector and health (medicine) and the field of logistics and more precisely the implementation of traceability, Based on an empirical study containing statistics on changes in medicine stock management within state health institutions (delegation and hospitals).

## INTRODUCTION

In an economic world that has become complex, globalized, and increasingly regulated. The four levers reactivity, reliability, efficiency, and ecology, becomes essential to manage companies. Adapting supply to changing market demands, constantly improving the quality of its resources and allocating those to sustainable and profitable activities has become fundamental. Driven by regulatory and safety concerns, companies have adopted the concept of traceability. In order to secure the products, their logistics units, their flows and processes, physical distribution, consumption, and recycling, to ensure their conformity with the regulations. As a result, traceability is anchored in the supply chain, and several scientific studies have shown this. It is essential throughout the logistics chain. The internal logistics assume having a stock management, but having extra stock costs money; the products can expire or can become unusable for different reasons. In addition, the different quality standards require more and more traceability of products. Stock management and product traceability go hand in hand. For this, our research concernsthe study of the traceability of the stock of medicines, within the delegations and hospitals of the grand-Casablanca region. After a presentation of the state-of-the-art stock management and traceability, we will present the results of a study carried out in the Casablanca region and a final conclusion.

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### Stock Management

The council of logistics management, 2001 defines logistics as "*the part of the supply chain process that plans, implements and controls the effective and efficient transit and storage of goods and services and related information, from the place of their creation to that of consumption, in order to meet the demands of consumers."* In this definition we note the management aspect that is summarized in the planning and the management of stock, as well as the aspect of the information. We will see in this part the management of stock and more particularly that of hospital logistics. According to LANDRY & al. [LANDRY, 2000] hospital logistics is defined as "*a set of design, planning and execution activities that enable the purchase, inventory management and replenishment of goods and services surrounding the provision of medical services to patients*".

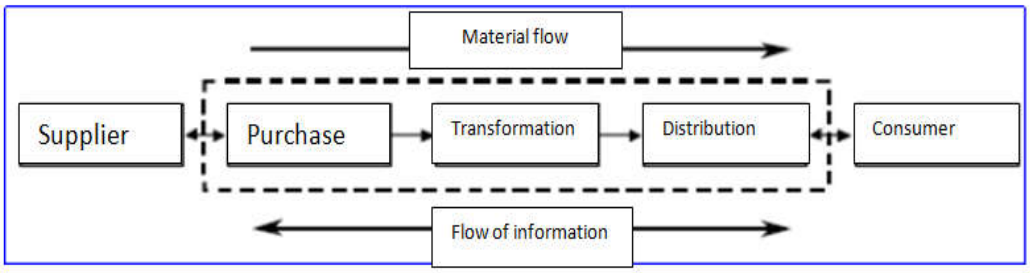
So hospital logistics is the set of activities of design, planning, supply management, delivery and return management, from the

provider to the patients. What we are concerned with here is how stock management is organized with the traceability system. In order to be efficient, the hospital must have an adequate stock, i.e. have a good stock management and know what products are in stock in the pharmacy and in what quantity. This means that the pharmacy must not fall in shortness of stock. The pharmacist must be able to know at any time: when to order, what to order and how much to order, taking into account the time of supply and replenishment. This information can only be known from the accurate and systematic recordings of several data, including:

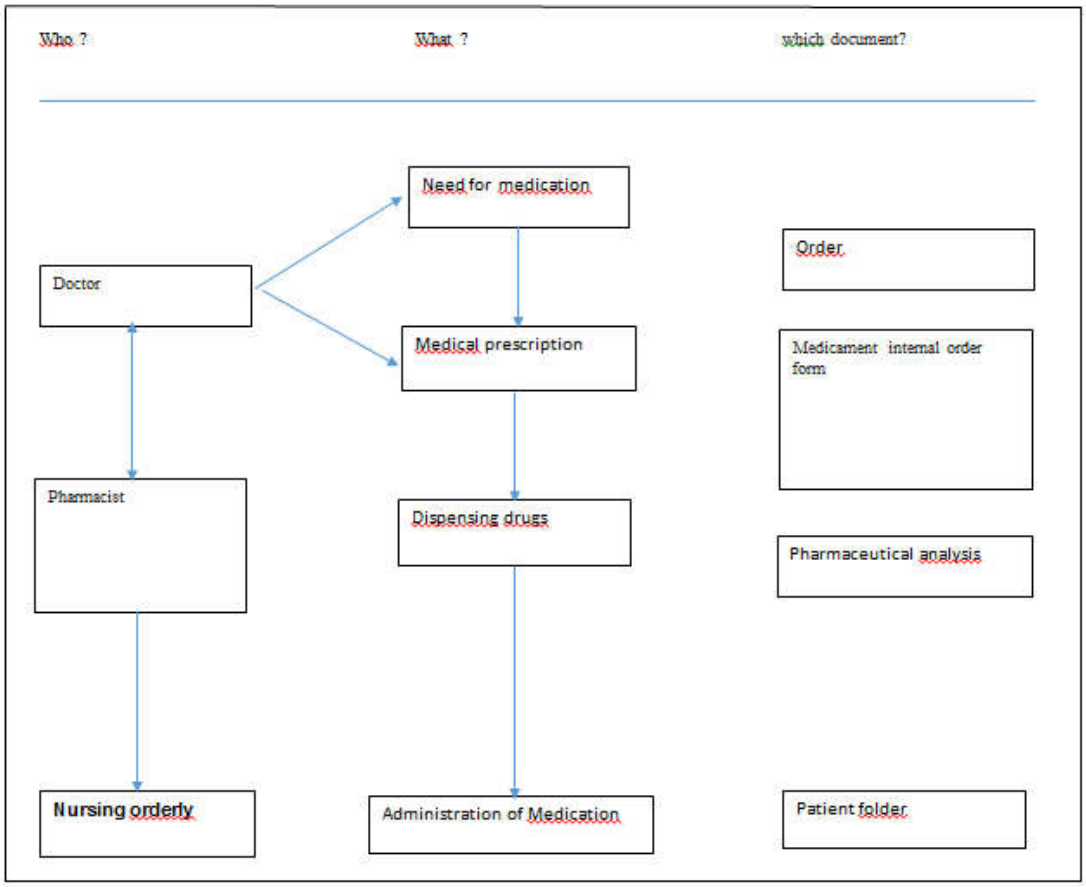
- The identification of each the products presented in the pharmacy (ED, galenic form, dosage and packaging).
- The recording of the movements of each product (date, nature of the input / output movement, source for the inputs or destination for the outputs) via the paper or computer inventory record.
- The actual inventory status of each of the products (physical inventory result) at the pharmacy.

This management requires, be controlling and understanding, the existence and the maintenance of a certain number of elements of management supports and reports, all integrated in an information system.

Stock management supports' overall objective of pharmaceutical inventory management is to find a balance between the stock needed and sufficient to meet the pharmaceutical needs of the hospital (Trouiller 2013). And overstock, which leads to waste and immobilization of goods to the detriment of other activities of the hospital, This balance is built by taking into account, on one hand, the internal data of the hospital (for example, by estimating / quantifying annual pharmaceutical needs, type of technical plateau and provision of care) On the other hand, the external environment of the hospital (for example, supply and replenishment times of suppliers, The logistic routing constraints of the on-site product).




**The boundaries of the logistics chain, Source: Christopher, 1998**




**The clinical circuit of the drug; Source: Trouiller; 2013**

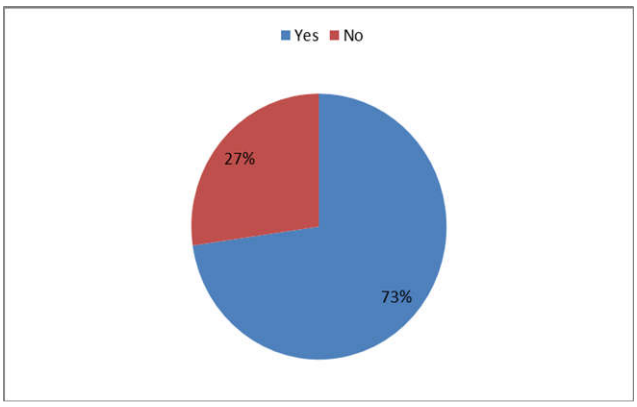
**The stock keeping record:** There must be a stock keeping record for each product held in stock, placed on the shelf, next to the corresponding product. This form follows a classic standard model and always includes, besides the identity of the product: the recording of input and output data (table of movements); the additional data required for dynamic management (average monthly consumption rated CMM *, CMM adjusted * rated CMMA and safety stock rated SS *), Each product stored in the pharmacy or any other place depending on the pharmacy (products stored in the refrigerator, freezer, or in service cabinets) must be listed, There will therefore be a stock keeping record for all pharmaceutical products listed, for each of the dosage forms of the same INN, a stock keeping record will be created for each new product and each time a product sheet is completely filled in (the completed form is initialed, numbered and archived). All products received in the pharmacy are recorded on cards. All movements are recorded without any delay; a stock record must be kept up to date in real time.

**Register of handrails and special registers:** The register of handrails and the special registers for psychotropic and narcotic drugs (also called registers of the pharmacy) are compulsory management documents (in paper or computerized form, according to the regulations in force ), Where all movements of pharmaceutical products are recorded in real time. They are intended to monitor and control all quantified movements of inputs and outputs (material traceability), as well as the physical inventory situation. These mandatory accounting documents are part of the material accounts.

**Traceability:** Traceability in the supply chain is currently an essential element in ensuring the reliability and legality of products. Traceability has recorded a great success since the 1990s. As defined in 1994 by the NF EN ISO 8402 standard, which was then replaced in 2000 by ISO 9000 and enriched in 2008 by ISO 22000 (Sep 2012), traceability refers to the ability to recover History, use and location of an entity by means of recorded identifications. Traceability systems can be considered as an operational tool for supply chain management (SCM) (Romeyer 2000, 2005, Colin, SaracAbsi, and Dauzere-Peres 2015) as a transversal concept (Pellaton and Viruega, 2007) Or as a strategic management process (KarâaMorana, 2008 and 2011). Traceability has the ability to properly track and locate a product's position throughout the supply chain; it is a key to managing operations and improving performance (Wang, Wang and Liu, 2008). (Saikouk, Zouaghi et Spalanzani, 2011). ; Information has economic value in supply chain management (Lee, therefore, and Tang, 2000). According to Cheng and Simmons (1994), we cannot manage what is not under control, we cannot control what cannot be measured and we cannot measure what cannot be detected. Identification of products along the supply chain is a pillar of traceability and offers businesses an important source of information for exploitation, management and strategic levels (Ngai *et al.,* 2007). For Crozier and Friedberg (1977), the actor who holds the "information" resource and the ability to effectively disseminate this resource has decisive leadership in its supply chain network. Traceability management is a strategic approach available to companies to better manage information's products and processes for better productivity and profitability. According to Brooke and Williams (2005), relevant information is the basis for any improvement in the supply chain; however, logistics chains have become so complex and decentralized information that dissipation is difficult to avoid (Chen 1999, Yu, Yan, Edwin and Cheng 2001, Saikouk, Badraoui, and Spalanzani 2014). According to Alfaro and David Marsden (2009), the use of traceability information can improve supply chain management. However, a study by Harwood and Humby (2008) pointed out that organizations rarely share information with their supply chain partners, which can have a negative impact on chain activities such as inventory management ( Yu, Yan, Edwin and Cheng, 2001), resource exchanges and collaboration (Yim and Leem 2013). In this article, we will try to find out what are the characteristics of the traceability technologies used in medicine's stock management? To provide answers to this question, we present in the next section our methodological approach and the results of our study.

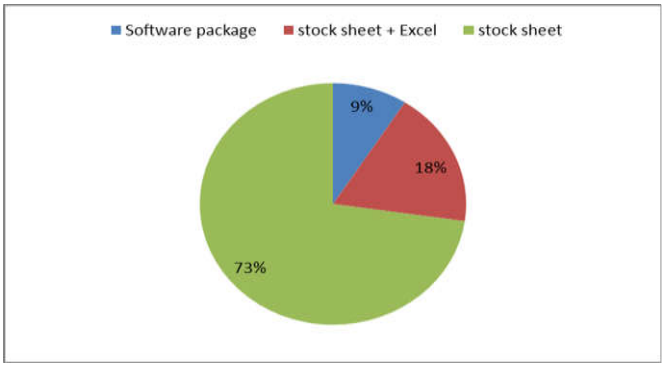
## METHODOLOGY AND RESULTS

This empirical analysis is based on a database that includes observations on the pharmacies of 22 establishments in the Grand Casablanca region, 11 delegations and 11 hospitals.The differences between the pharmacy of a delegation and that of a hospital. Concerning the pharmacy of the delegation, it manages several centers of health regarding medicines. It acts as an intermediary between the national depot and the health centers by the internal pharmacy of the delegation. It is a kind of distributor for the health centers. While the pharmacy of the hospital plays the role of depot, which manages the stock of medicines, and distributes them between the different departments within the hospital. These establishments have one thing in common that is the management of their stocks, which is what we tried to dissect in this study. For the results of our study we found that all the delegations have a storage method, while 73% of

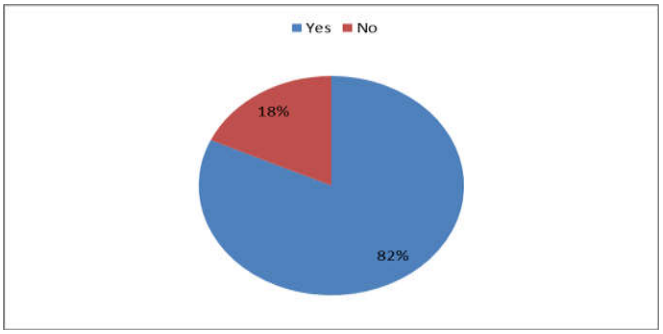



**Percentages of delegations with IS**

The functions of this IS within delegations are supply management and pharmacy. Only internal medication tracking is done via a software package or a stock card with Excel, or only with a stock card. The following graph shows the percentages of use of these monitoring tools within delegations. Stock management is a difficult task, staff can make mistakes. According to our study we found that 82% of the delegations use rectifications of stock as the following graph shows:

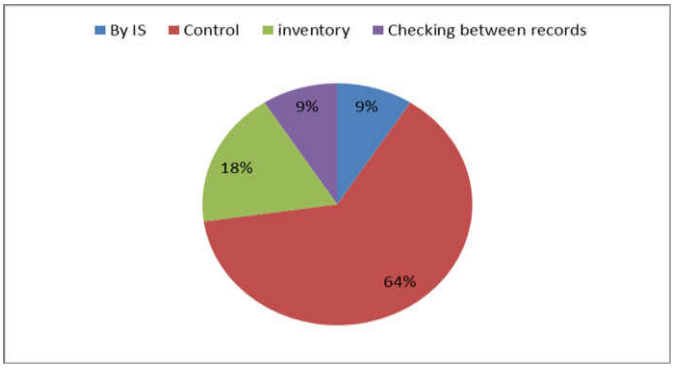



**Percentages of stock tracking tools in Delegations**



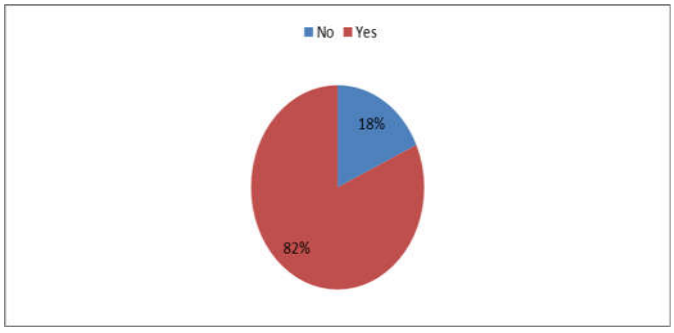

**Percentages of stock adjustments in Delegations**

With regard to the procedure for rectification of errors, 9% by IS, 9% by checking between cards, 18% by inventory, and 64% by control.



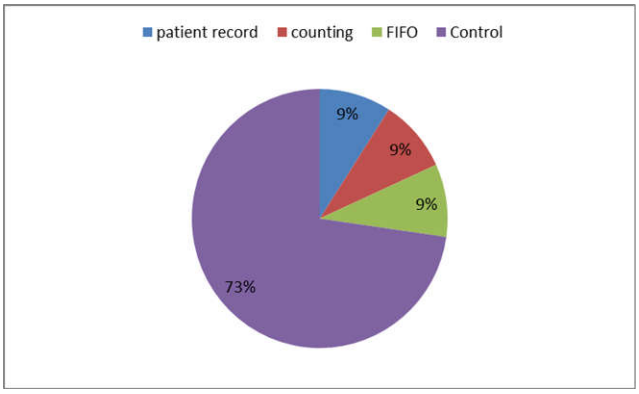

**Procedure for rectification of inventory within Delegations**

For hospitals, the results of our study revealed that only 73% of hospitals have a storage method, but 82% of them state that they have an IS for monitoring the stock of medicines.



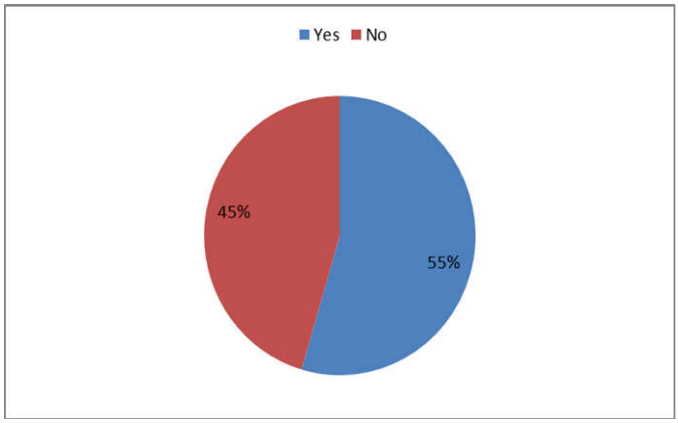

**Percentages of hospitals with IS**

The functions of this IS within hospitals are supply management, pharmacy management, and patient management. But the internal monitoring of medicines does this via counting, or FIFO (first in first out) method, or a patient record, or control. The following graph shows the percentages of use of these monitoring tools within delegations.



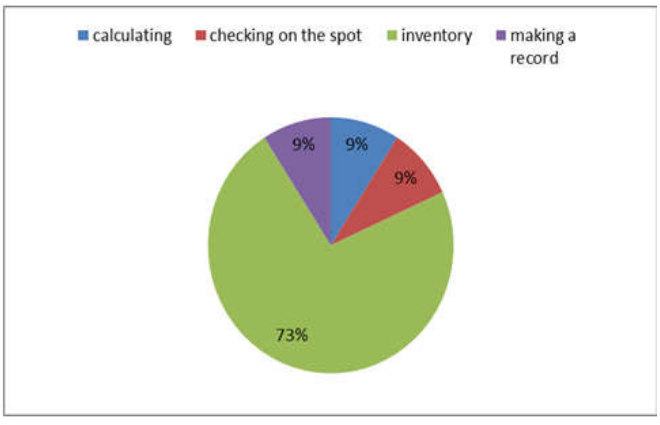

**Percentages of stock tracking tools within hospitals**

Stock management is a difficult task, staff can make mistakes. According to our study, only 55% of hospitals have recourse to stock adjustments as shown in the following graph:




**Percentages of stock adjustments within hospitals**

As regards the procedure for correcting errors, 9% by making a record, 9% by checking on the spot, 9% by calculating, and 73% by inventory.




**Procedure for rectification of stock within hospitals**

## DISCUSSIONS

According to our empirical study carried out in the Grand-Casablanca region at the level of the healthcare establishments (delegations and hospitals), for the stock management of medicines, we found that more than 90% of the health establishments use basic methods Office automation) and manuals for the management of their medicines stocks, the rest of the establishments use efficient information systems (management software package). This situation creates management problems, including errors in the stock of medicines, which can lead to a shortage of stocks or outdated medicines in stock. Computerized traceability comes as a solution to this situation, giving us the opportunity to have total control over the logistics chain within healthcare institutions (delegations, hospitals), and more specifically stock management and the internal circulation of medicines.

### Conclusion

The reliability of hospital logistics in the management of medicines requires reliable and precise skills and knowledge throughout the logistics chain. This requires good information management which can be achieved through the use of computerized traceability. The design of the traceability gives us a global vision on the internal logistics chain, either in terms of product circulation or control of inputs and outputs, which results in good inventory management. Our work carried out in the state health institutions in Morocco, the region of Casablanca, comes to give a vision on the tools and methods used for the hospital logistics chain and more specifically stock management and its traceability. Our study demonstrated several concerns in terms of stock management, internal traceability and the internal circulation of medicines. To solve these problems, a system of the hospital logistics chain of state establishments must be modeled, which can be applied through the use of a software package.

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