

Implementation Of A New Management Tool For Dead Stock Of Pharmaceutical Products In The Hospital

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Abstract :

The management of pharmaceutical inventories is a critical component of hospital pharmacy practice, directly influencing both economic performance and medication availability. Inefficient stock management often leads to the accumulation of “dead stock” — medications with minimal or no turnover — resulting in significant financial and logistical burdens.

This study aims to design and implement a new management tool for the control and prevention of dead stock within the central pharmacy of the Hassan II University Hospital in Fez, Morocco.

The work includes an analytical review of the causes, consequences, and management processes related to dormant pharmaceutical stock. It integrates a proposed decision-making flowchart, a management circuit, and a SWOT analysis to evaluate the strengths, weaknesses, opportunities, and threats influencing the system. Dead stock arises from multiple intrinsic and extrinsic factors such as inaccurate needs assessment, poor communication between departments, changes in therapeutic protocols, and the obsolescence of certain medications. The proposed model introduces corrective and preventive actions — including inter-hospital exchanges, supplier commitments, targeted training, and digital monitoring tools — to optimize the supply chain and minimize waste.

The implementation of this structured management tool enhances traceability, rationalizes resource utilization, and supports a sustainable hospital pharmacy strategy. By combining conventional management practices with modern information technologies, this model provides an adaptable and efficient approach to reducing dead stock and improving pharmaceutical governance.

Keywords : Pharmaceutical product, Management of Dead stock, Hospital pharmacy.

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I. INTRODUCTION

Among the core activities of hospital pharmacy, the management of pharmaceutical product inventories holds a paramount position [1,2]. These activities encompass a set of pharmaceutical operations that ensure the availability of medications and control costs related to expirations and dormant stock.

Generally, economic losses are avoidable when appropriate management, implementing efficient measures, allows for their control or even prevention [3].

This work, entitled "Implementation of a New Tool for Managing Dead Stock of Pharmaceutical Products at the Hospital," aims to provide a practical tool to manage and prevent the occurrence of dormant pharmaceutical stock within the central pharmacy of the Hassan II University Hospital in Fez. This work comprises two parts: the first chapter focuses on the causes and various consequences related to dead stock. The second chapter deals with the different aspects of managing dead stock of pharmaceutical products (decision flowchart and management circuit), whether they are vital, essential, of major therapeutic interest, or non-essential. Finally, a SWOT analysis highlights the strengths, weaknesses, opportunities, and threats that influence the hospital pharmacy environment and shape current management practices.

1. Definition of Dead Stock or Dormant Stock

Dead stock refers to a collection of products, equipment, materials, or physical goods with a very low or non-existent turnover rate [4,5,6].

This definition remains incomplete as it does not clearly specify the threshold between what is acceptable and what is not. Although this parameter is quantifiable, in practice, the assessment of inactive stock is carried out on a case-by-case basis.

2. Causes of Dead Stock

Two factors contribute to the creation of dead stock : external factors and internal factors. [4, 6, 7, 8, 9, 10]

Intrinsic factors are defined as any event directly influencing the pharmaceutical logistics circuit: management, inventory control, communication, purchasing operations, etc. Extrinsic factors, on the other hand, correspond to events that indirectly affect this circuit.

External Factors	Facteurs internes
-Departure of a practitioner (retirement, transfer, reassignment, or death) who initiated the introduction of a pharmaceutical product into therapeutic protocols. -Decrease in average consumption following a force majeure event (e.g., a pandemic disease). -Introduction of a new product without proven medical benefit listed in the official formulary/nomenclature. -Change in therapeutic protocol and, consequently, introduction of a new product at the expense of another. -Pharmacovigilance: withdrawal of a product following the occurrence of serious and frequent adverse effects. -Pharmaceutical product becoming obsolete due to the market introduction of a more effective and innovative alternative. -Change in legislation.	-Inaccurate needs assessment, where estimated quantities significantly exceed actual requirements. -Inadequate inventory management, characterized by insufficient tracking of average consumption. -Uncertainty regarding the average consumption of a new product introduced into the formulary. -Insufficient communication regarding the introduction of a new pharmaceutical product into the formulary or the restocking of a product after a prolonged shortage.

3. Consequences of Dormant Stock

From a practical standpoint, the occurrence of dormant stock is avoidable. It leads to several consequences across three areas:

-Economic consequences: These can be direct or indirect [5, 11, 12, 13].

Direct Economic Impact	Indirect Economic Impact
-Capital tie-up that could have been invested in the purchase of vital pharmaceutical products and those of major therapeutic interest (MTI). -Reduction in profit margins due to decreased demand for products that are no longer being billed or sold.	-Expired products and their disposal costs. -Storage costs related to space occupancy that could have been allocated to other products with higher turnover. This cost becomes more significant for products stored in refrigerated areas.

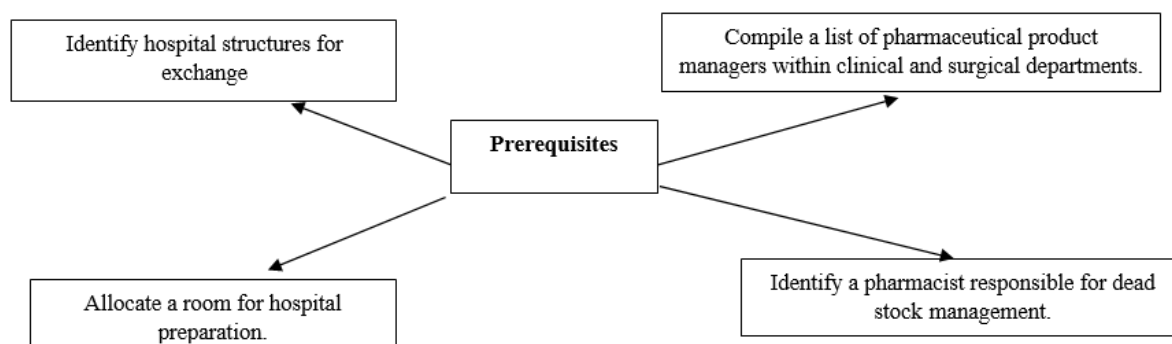
-Logistical consequences affecting the medication supply chain, more specifically the storage stage. This concerns pharmaceutical products with bulky and cumbersome packaging that occupy significant storage space and which are overstocked [8, 14, 15].

-Health consequences due to the decline in the quality of care provided to patients [16, 17].

-Political consequences, particularly on the pharmaceutical policy of the Ministry of Health and Social Protection, whose objective is to rationalize the use and availability of effective, quality pharmaceutical products at lower cost [XX].

II. PROPOSITION FOR A NEW MANAGEMENT MODEL OF DEAD PHARMACEUTICAL STOCK IN THE HOSPITAL

The implementation of measures to control dormant stock requires the prior fulfillment of certain prerequisites.



For the management of dead stock, two types of measures are proposed:

Measures for controlling vital pharmaceutical products and those of major therapeutic interest. Even though their use is limited, these products must be kept in stock, but in small quantities.

Measures for controlling essential and non-essential pharmaceutical products.

All these measures are classified as either preventive actions (implemented proactively) or corrective actions (implemented after the appearance of dead stock).

Pharmaceutical Products Management Measures	Corrective Actions (CA)/ Preventive Actions (PA)
Management Measures for Vital and Major Therapeutic Interest Products :	
-Exchanging stock with other hospital structures	CA and PA
-Creating WhatsApp groups to communicate about dead stock	PA
-Procuring medications through a contract model	PA
-Monitoring therapeutic advancements	PA
-Adapting the supply chain for just-in-time delivery	PA
-Identifying a pharmacist responsible for managing dead stock	CA and PA
Management Measures for Essential and Non-Essential Products:	
-Distributing stock among clinical departments	CA and PA
-Blocking orders with suppliers	PA
-Pharmaceutical technology (compounding/preparation)	PA
-Awareness campaigns to promote the use of existing stock, conducted via pharmaceutical company representatives	PA
-Donations	CA
-Requesting a letter of commitment from suppliers	PA
-Identifying a pharmacist responsible for managing dead stock	CA and PA

1. Management Specific to Vital Products and Those of Major Therapeutic Interest

Management elements for this product category must account for their vital nature. It is therefore necessary to maintain a minimum stock level, even for those with low turnover.

The pharmacist must identify the various hospital structures that could participate in exchanges or loans of pharmaceutical products (PP) that may be in a dead stock situation.

Some PPs can be acquired using the conventional method, whose advantage is enabling just-in-time ordering (tight flow) for products that have previously been dead stock.

Creation of a WhatsApp group including head nurses and PP managers to share the list of products available in the pharmacy or clinical departments that are not being used.

Establishment of a health monitoring unit to identify new innovative treatments and new therapeutic protocols that are more effective than existing treatments, which could render usual treatments obsolete.

Stock optimization by ensuring redistribution of dead stock between non-user departments and those with high usage rates.

2. Management Specific to Essential and Non-Essential Products

By blocking all orders for products in a dead stock situation from suppliers, preventive and corrective measures are simultaneously implemented.

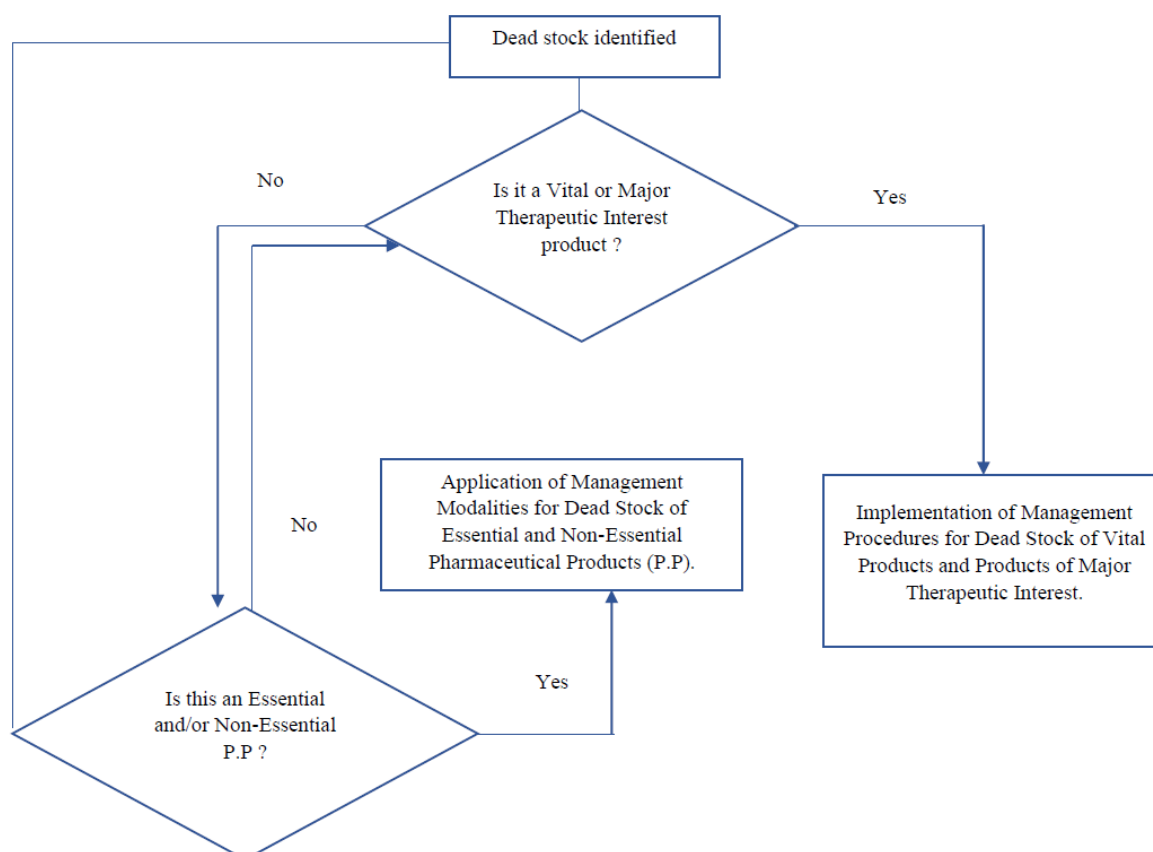
Company representatives and medical delegates can raise awareness and promote the prescription and use of their products among physicians.

Establishment of a pharmaceutical technology unit for extemporaneous preparation of medications, reagents, solvents, and solutions upon request, as needed, to avoid stock accumulation.

Donations primarily concern non-essential pharmaceutical products and those whose storage cost exceeds their acquisition cost.

Suppliers who have failed to comply with the strict conditions stipulated in the special specifications document must prepare and sign a commitment letter aimed at recovering products that constitute low-turnover or excess stock.

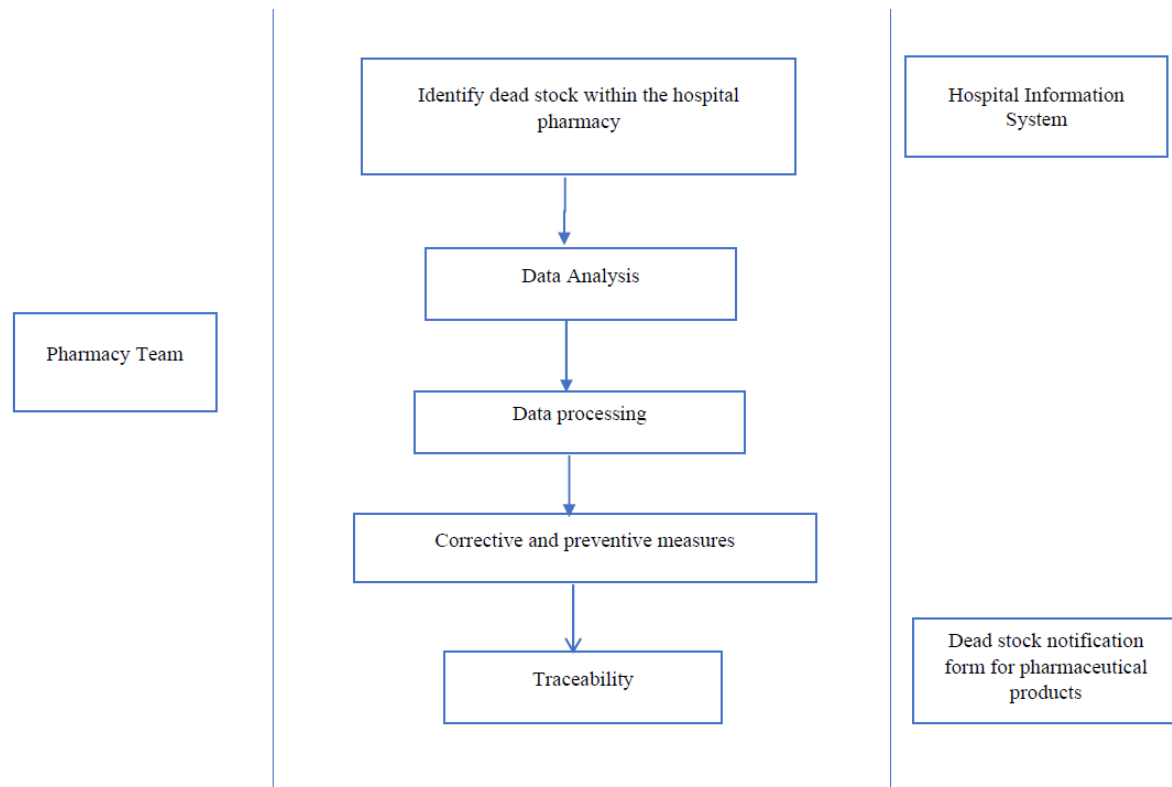
DECISION DIAGRAM FOR DEAD STOCK MANAGEMENT OF PHARMACEUTICAL PRODUCTS



3. Proposal for a Pharmaceutical Dead Stock Management Process

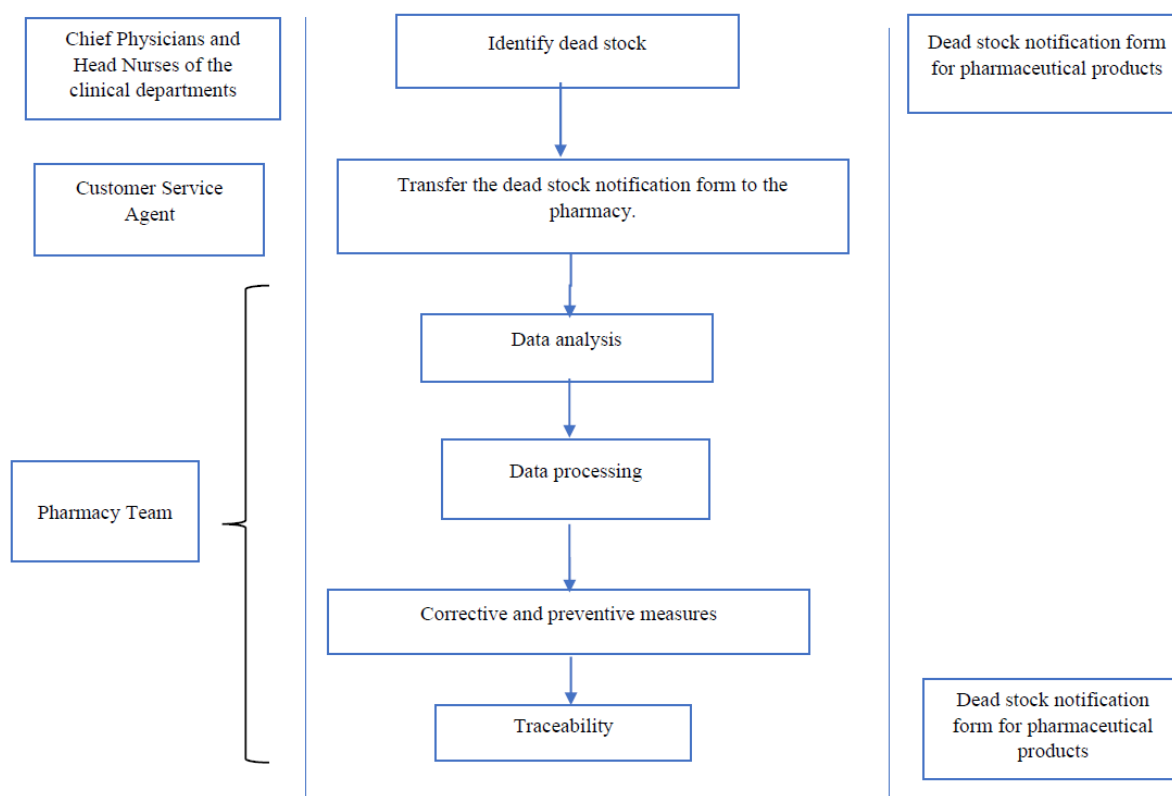
-Dynamic Management Process

This process implements a bottom-up management approach for dead stock. The latter is identified upstream by the pharmacy team. The collected data is analyzed, processed, and then recorded on a traceability form (Figure 1), as part of a proactive approach.



-Spontaneous Management Process

In this process, dead stock is identified within the user departments. The physician or head nurse records this stock on a notification form, which is then forwarded to the pharmacy.



At the pharmacy level, the team composed of the pharmacist, the head nurse, and the pharmacy technicians utilizes data from the hospital information system to identify dead stock. Within the clinical departments, the dormant stock thus identified is recorded on a form and then transferred to the pharmacy for potential analysis and decision-making.

The data analysis involves identifying the causes and duration of the dead stock, the user departments, the expiration date, the supplier, and the acquisition modalities of the pharmaceutical products (framework agreement or conventional purchase).

The data processing involves addressing the causes through corrective and preventive measures. All these pharmaceutical operations are documented on a pharmaceutical products dead stock notification form, which is then archived.

4. Challenges of Dead Stock Control

4.1 Economic Challenges

At the Hassan II Hospital in Fez, pharmaceutical product inventories represent approximately 40% of the overall operating budget. Although limited in volume, dead stock generates significant economic losses, including storage costs, the cost of expired medications, and expenses related to their disposal.

4.2 Political Challenges

As part of its pharmaceutical policy, the Ministry of Health and Social Protection aims to rationalize the use of health products while guaranteeing their availability, both quantitative and qualitative, through rigorous pharmaceutical management and optimized purchasing procedures [xx].

4.3 Health Challenges

From a health perspective, eliminating unused pharmaceutical products helps prioritize the supply of quality medications with high therapeutic value, proven efficacy, and which are among common prescriptions.

4.4 Logistical Challenges

In the pharmaceutical supply chain, storage - a crucial step - guarantees medication quality and ensures supply continuity. The elimination of dormant stock will improve storage efficiency while optimizing the available space (Positive economic impact).

5. SWOT Analysis of the Pharmaceutical Product Inventory Management System at the Pharmacy Level

Strengths

Technological Resources:

- Availability of a high-performance hospital information system.
- Availability of automated dispensing cabinets interconnected with the hospital information system, enabling the detection of dormant stock in clinical departments.
- Availability of television screens in the pharmacy broadcasting information and news on pharmaceutical products.

Human Resources:

- Multidisciplinary team for stock management (pharmacists, specialist pharmacists, IT technicians, nursing assistants, and pharmacy technicians).

Procedural Resources:

- Well-defined clinical and logistical circuits for pharmaceutical products.
- Validated drug stock management procedures and quality manual.

Weaknesses

- Although the available resources allow for the identification of dead stock, they remain insufficient to comprehensively address, prevent, and correct all related shortcomings:

- Communication channels regarding dead stock are inadequate for informing all hospital practitioners, especially given the constant turnover of intern and resident physicians, as well as new recruits.
- No pharmacist is formally assigned to the activity of identifying and managing dead stock.
- Absence of a dedicated logistical process (circuit) for managing dead stock.
- Lack of specific procedures for dead stock management.

Opportunities

- Sufficient number of pharmacists to appoint a dedicated manager for dead stock and formalize this role.
- Availability of a dedicated website for the Fez University Hospital to host all information related to hospital pharmacy management.
- Creation of a dedicated pharmacy newsletter to publish pharmaceutical updates, including information on dead stock.
- Introduction of a new generation of automated dispensing cabinets for the storage and management of pharmaceutical products.

Threats

Even after developing and implementing a dead stock management system, certain deficiencies persist and remain beyond full control:

- Changes in therapeutic protocols following the introduction of new, innovative molecules, which may generate dead stock for less effective therapeutic equivalents.
- Transfer or retirement of a medical doctor who was involved in the selection of pharmaceutical products that are not used by other practitioners.

Limitations of Dead Stock Management:

Difficulty managing bulky products that cannot be stored in automated dispensing cabinets, as well as those stored in clinical departments within pharmacy cabinets and office drawers.

The transfer or retirement of a practitioner can contribute to pharmaceutical products they used in therapeutic protocols becoming dead stock.

II. CONCLUSION

Among the consequences of non-moving stock, the disruption of the pharmaceutical supply chain holds a predominant place due to the breakdown of the balance between supply and demand. This situation occurs to the detriment of products that are available in sufficient quantity and quality but are no longer prescribed by users.

The proposed tool manages obsolete stock by employing both conventional management methods and modern methods leveraging scalable technologies, in line with the growing maturity of the pharmaceutical supply chain.

The proposed model intervenes both upstream and downstream of the management process to prevent, or even manage, deficiencies related to non-moving stock. The effectiveness of this tool can only be demonstrated through its practical application in the field, with a focus on continuous improvement.

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