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Evaluation of the Performance of the Supply Chain Management System for Medicines, Reagents, and Laboratory Consumables in the Public and Private Sectors in Benin in 2025

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Abstract

The supply chain of medicines, reagents, and medical consumables (MRCs) plays a crucial role in the effective functioning of the healthcare system by ensuring the continuous availability of essential health products. This study aimed to evaluate the performance of the supply chain management system for MRCs in the public and private sectors in Benin in 2025, assess the level of supply chain performance, and identify the factors influencing this performance. A descriptive and analytical study was conducted in public and private institutions. The evaluation was carried out using the Supply Chain Operations Reference (SCOR) model, Key Performance Indicators (KPIs), and management support components. Data were collected through document review, interviews, and direct observation. The results revealed an overall performance rated as good (75% - 81%), with good performance in management support (78%) and the SCOR component (83%). However, the performance indicators highlighted several shortcomings (65%), including product availability below recommended standards, frequent stockouts, prolonged delivery lead times, and high loss rates. Disparities were also observed among facilities, with the private sector generally performing better than the public sector. The factors explaining this performance included the availability of management tools, well-structured logistics processes, and the existence of information systems. However, constraints related to human resources, infrastructure, and financing limited overall performance. In conclusion, targeted interventions are needed to improve the efficiency of the system and ensure continuous access to essential health products.

Keywords

Supply Chain Management, Medicines, Laboratory Reagents, Medical Consumables, SCOR Model, Logistics Performance, Benin

1. Introduction

Medicines, laboratory reagents, and consumables (MRC) are health products, according to the World Health Organization (WHO), that contribute to achieving or maintaining a state of complete physical, mental, and social well-being [1]. They play a central role in most interventions aimed at fighting diseases. Their availability and accessibility at all levels of the health pyramid are crucial to ensuring a safe, reliable, and sustainable supply chain, in line with the objectives of the National Pharmaceutical Policy (NPP) and the Global Fund's mission to end epidemics. In Benin, the supply chain management system (SCMS) is mainly divided into two categories: the public supply system and the private supply system [2] [3]. The goal was to evaluate the performance of the supply chain management system for medicines, reagents, and laboratory consumables in the public and private sectors in Benin. Specifically, we described the supply chain management system of RDTs in both the public and private sectors, then assessed the performance of the RDT supply chain management system in these sectors, and finally identified the factors that could explain the performance level of the management system for medicines, reagents, and laboratory consumables in the public and private sectors in Benin.

2. Materials and Methods

This was a cross-sectional, descriptive, and evaluative study carried out in 2025. The study population consisted of the primary target, which included warehouses and cold rooms at every level of management for medicines, reagents, and medical consumables in both the public and private sectors, while the people involved in managing MRC represented the secondary target. Warehouses and cold rooms, as well as people involved in MRC management, who had been working for at least six (06) months and agreed to participate in the study, were included.

The sample size was the total number of warehouses and cold rooms present at the Beninese Society for the Supply of Health Products (SoBAPS), the Regional Agency of Cotonou (ARC) of SoBAPS, the Hubert K. Maga National University Hospital Center (CNHU-HKM), and the Bio Group Laboratories company—SYSMET, as well as, on the other hand, the people involved in the management of MRCs, working for at least six (06) months. The non-probabilistic method and sampling techniques, such as exhaustiveness for the selection of warehouses and cold rooms, and purposive selection for individuals involved in the management of MRCs, working for at least six (06) months, were used. Our study focused on two components: the main component and the explanatory components. The main

component was the performance of the MRC Supply Chain Management System (SCMS) in the public and private sectors. The explanatory components were represented by: "management support," the "Supply Chain Operations Reference (SCOR)," and "Key Performance Indicators (KPIs)." The different components are broken down into their sub-components. The sub-components of the "management support" component were: human resources, infrastructure and equipment, and tools for management, technology, financial resources, the management information system of logistics, and service operations. The sub-components of the "Supply Chain Operations Reference (SCOR)" component were: planning and forecasting, procurement and inventory management, production and quality control, distribution and transportation, and returns/waste management. The sub-components of the "Key Performance Indicators (KPI)" component are: indicators related to supply chain reliability, indicators related to system responsiveness, and indicators related to efficiency and costs. To define the criteria for the different sub-components, we referred to certain national and international standard and guideline documents. These documents include: the Logistics Indicators Evaluation Tool (OEIL) developed by USAID [4]; the stock management procedures document of SoBAPS SA [5]; the management manual for the use of drug managers and members of management committees at the peripheral level [6] and the combination of two methodologies, "GRAI" and "SCOR," for modeling and improving the performance of the downstream pharmaceutical supply chain [7]. Regarding the rating principle, the sub-components of each component (Management Support, SCOR, and KPI Performance Indicators) are composite variables with well-defined criteria associated with them. Each criterion was presented with its different assessment elements by assigning them scores. Scores of one (1) or zero (0) were given depending on whether the criterion was present or absent. The total score was calculated by summing the scores obtained for the criterion. The sum of the scores for all criteria gave the score for the sub-component. The sum of the scores for all sub-components gave the score for the component. The performance score of the SGCA of the MRCs in the public and private sectors was the result of the outcomes from all the warehouses and secondary targets, taking into account elements from Management Support, SCOR, and the KPI performance indicators of the secondary targets. For data collection, various techniques and tools were used. **Table 1** presents the collection techniques and tools used during our study. To identify the explanatory factors for the performance level of the supply chain management system for medicines, reagents, and lab consumables, we used the SWOT analysis method to determine strengths, weaknesses, opportunities, and threats.

2.1. Data Processing and Analysis

We checked the quality and classification of the data during the manual review of interview guides and during computerized data processing: creating a template and entering data (questionnaire, observation grid, and review) into Excel.

Table 1. Summary of data collection techniques and tools by target for evaluating the performance of MRC SGCA in the public and private sectors in Benin in 2025.

Targets	Data Collection Techniques	Data Collection Tools
Warehouses/CF	Observation	Observation guide
Documents	Document handling	Data extraction sheet
Staff involved in managing the MRCs of SoBAPS, ARC, CNHU, and BGL-SYSMET	Interview	Interview guide
Storekeepers of SoBAPS, ARC, CNHU, and BGL-SYSMET	Survey by questionnaire	Questionnaire

Then, the data analysis was done using STATA.11 and Excel according to our needs. Next, the assessment of the performance of the SGCA of the MRCs in the public and private sectors was carried out by component and sub-component to generate the overall result (using Excel software).

2.2. Evaluation Criteria

The total score for the criteria for each sub-component was expressed as a percentage of the total expected score to serve as a basis for evaluating the sub-component. Similarly, the component score was also expressed as a percentage of the total expected score for its assessment.

The assessment of the SGCA of the MRCs in the public and private sectors was done by starting from the percentage of the score obtained for the components "Management Support," "SCOR," and "Performance Indicators" compared to the total expected. For each sub-component of the system, the following ratings are assigned based on the scores for the different criteria, according to the measurement scale adapted to the SCOR model [8]. 1) If the total score of the sub-component's criteria is between 90% - 100%, it means that almost all evaluation criteria are satisfactory. A grade of A will be given to this score. The corresponding assessment of the performance of the MRC's SGCA is "Excellent." 2) If the total score of the sub-component's criteria is between 75% - 89%, it means that almost all evaluation criteria are satisfactory. A grade of B will be given to this score. The corresponding assessment of the performance of the MRC's SGCA is "Good." 3) If the total score of the sub-component's criteria is between 60% - 74%, it means that almost all the evaluation criteria are acceptable. A score of C will be assigned for this. The corresponding assessment of the MRC SGCA performance is "Acceptable." 4) If the total score for the sub-component criteria is between 45% - 59%, it means that most of the evaluation criteria are low. A score of D is assigned for this. The corresponding assessment of the MRC SGCA performance is "Low." 5) When the total criteria for the sub-component are below 45%, it will mean that very few of the evaluation variables are satisfactory; a score of is assigned for this. The corresponding assessment of

the MRC SGCA performance is "Critical."

3. Results

The results of our study were presented according to the specific objectives, after describing the characteristics of the different populations studied.

3.1. Description of the Study Sample

The targets of our study were warehouses, stores, and cold rooms where MRC management is carried out, as well as the people involved in managing MRC who had been working for at least six (06) months before data collection.

- Warehouses/Stores and Cold Rooms

We collected our data in four (04) public and private structures that have stores and cold rooms where MRC are stored.

Figure 1 shows the different stores and cold rooms of the public and private structures where the data collection was carried out.

- Healthcare Workers Involved in Managing NCDs

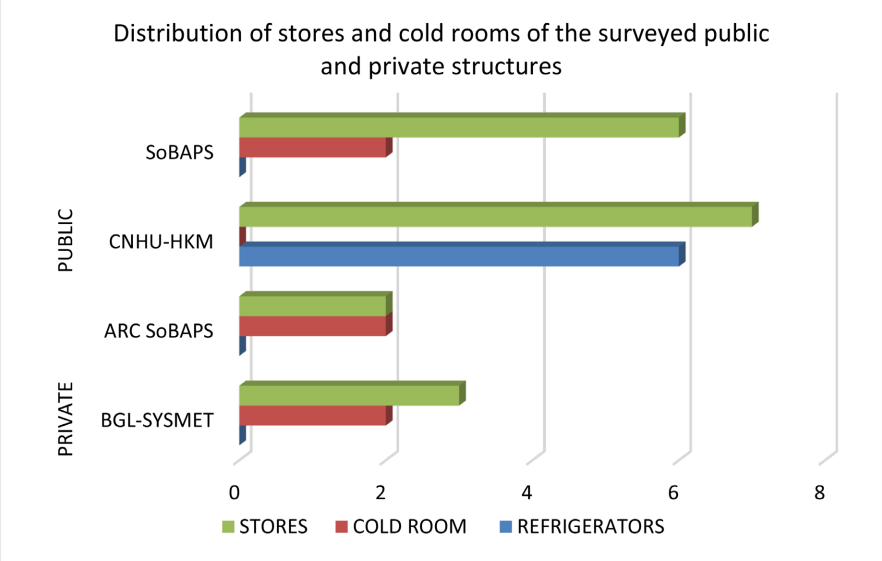

Figure 1. Distribution of the stores and cold rooms of public and private facilities where the collection was carried out.

- Stock managers who are health logisticians (one at SoBAPS and the second at BGL-SYSMET): 02

- Logisticians of the person responsible for public markets and procurement (PRM-PA) SoBAPS: 03

- Storekeepers: 12

- Pharmacists: 03

- Transport officers: 04

- Delivery people: 04

- Laboratory technicians: 03 (Table 2)

Table 2. Summary of the total number of eligible staff members who participated in the study evaluating the performance of the MRC supply chain management system in the public and private sectors in Benin in 2025.

Type of Facility	Facilities	MRC Supply Chain Actors	Number	Total
Publiques	SoBAPS SA	Stock managers/Logistics officers	4	31
		Storekeepers	4	
		Pharmacist	1	
		Transport officer	2	
		Delivery personnel	0	
		Laboratory technicians	1	
	ARC	Stock managers/Logistics officers	0	
		Storekeepers	3	
		Pharmacist	1	
		Transport officer	0	
		Delivery personnel	0	
		Laboratory technicians	0	
	CNHU-HKM	Stock managers/Logistics officers	0	
		Storekeepers	2	
		Pharmacist	1	
		Transport officer	2	
		Delivery personnel	0	
		Laboratory technicians	1	
Privees	BGL-SYSMET	Stock managers/Logistics officers	1	
		Storekeepers	2	
		Pharmacist	0	
		Transport officer	2	
		Delivery personnel	3	
		Laboratory technicians	1	

3.2. Description of the Supply Chain Management System of the MRCs in the Public and Private Sectors in Southern Benin in 2025

3.2.1. Management Support

Human Resources

- Availability and qualification of staff at every management level

Figure 2 shows that 40% of the surveyed staff are warehouse workers, followed by logisticians (14%), delivery personnel, and transport officers (13% each). The

least represented are pharmacists and laboratory technicians (10% each). Most staff at each management level (warehouse workers) were not qualified for their positions.

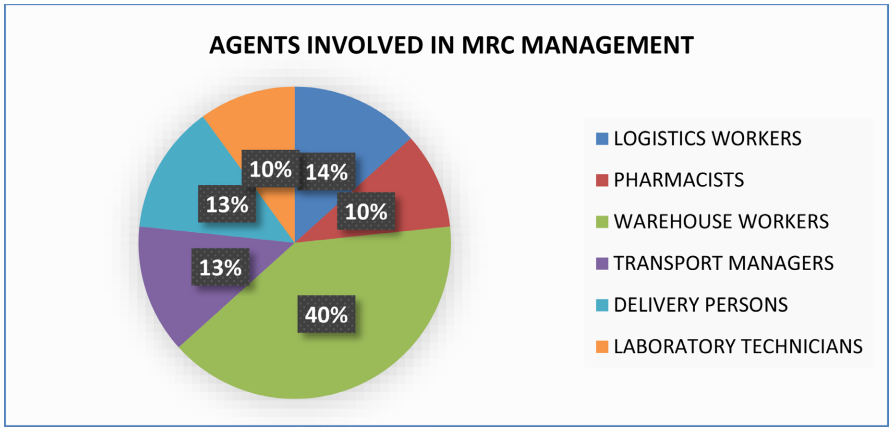

Figure 2. Characteristics of the socio-professional profile of agents involved in the management of surveyed MRCs.

- Staff training and continuous education at each management level

All surveyed personnel (100%) received training on RRM management, except CNHU-HKM staff, who did not receive ongoing training.

- Supervision of staff

All surveyed staff reported being supervised on RRM management (100%) over the past six months by their hierarchy. However, no warehouse had a supervision logbook. Supervision teams came from partners, namely PNLP, PNT, and PSLS, or were sometimes joint teams for SoBAPS and ARC. Regarding CNHU-HKM and the company BGL-SYSMET, we had joint teams or auditors coming from the Ministry of Health who came from outside. The number of years of experience of the staff in warehouse management ranged from 3 to 16 years.

• Availability of organizational chart and job descriptions

Organizational charts and job description sheets were available in all warehouses and cold rooms of (100%) of SoBAPS, ARC, CNHU-HKM, and BGL-SYSMET, but were not posted; all warehouse managers had a job description, which is 100%.

3.2.2. Management Tools

All warehouses and cold rooms had 100% of stock management sheets, inventory sheets, and daily consumption registers for MRC. All structures had the document of national guidelines, the document of national pharmaceutical policy, the document of national procedures, and the annual work plan. Only SoBAPS and the company BGL-SYSMET had customs clearance and shipping procedures for the MRCs. Figure 3 shows the results from the analysis of this subcomponent.

Infrastructure and Equipment

All warehouses and cold rooms were secure and protected (90% respectively), except for CNHU-HKM, which did not have a cold room but rather refrigerators; the warehouse roofs were all in good condition and ventilated; the warehouses

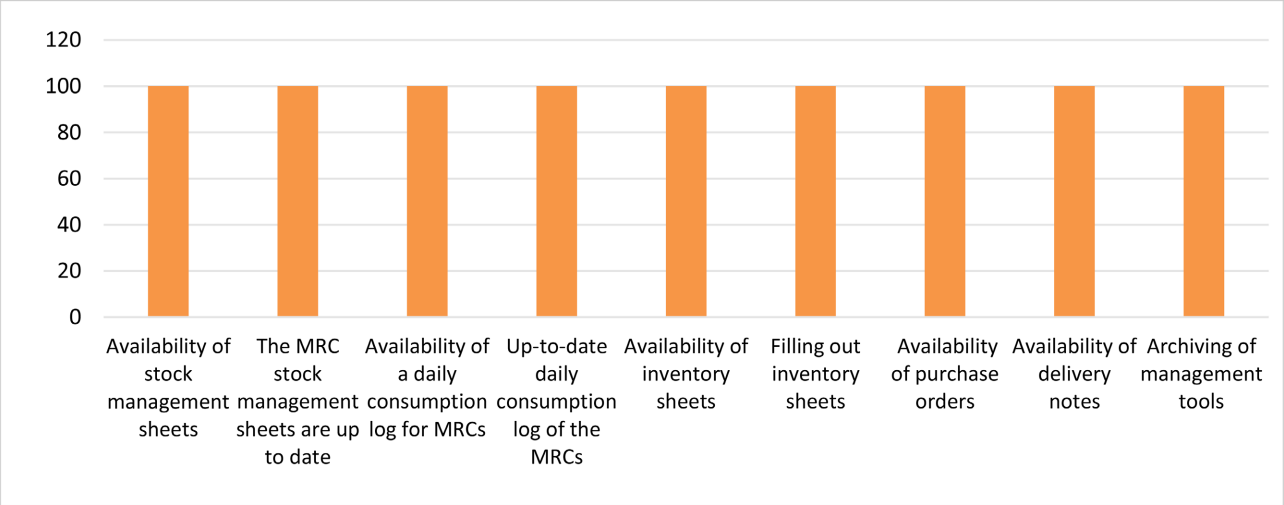

Figure 3. Availability and completion of MRC management tools.

and cold rooms were lit; the infrastructure and equipment were of good quality. Regarding the warehouses surveyed, only CNHU-HKM and BGL-SYSMET stores did not have all the equipment, such as pallet jacks and fire extinguishers, but offices were available in all the warehouses surveyed.

- Technology and Logistics Management Information System (LMIS)

The management software, SAGE 100 CLOUD version, was available, functional, and used for stock management at SoBAPS. All warehouse managers/storekeepers surveyed were trained in its use (100%). It was functional and used for stock management; similarly, at 3.3. Within the private company BGL-SYSMET, we had the ERP (Enterprise Resource Planning) software, which in French means Progiciel de gestion intégré, and all warehouse managers/investigated storekeepers were trained to use it (100%); it was also functional and used for inventory management. All the warehouses from SoBAPS and ARC that were investigated had electronic SIGL reporting support. All ten investigated warehouses (10/10) had submitted reports for the past 6 months on time and regularly (promptly). There was consistency between the report data and the physical inventory. As for CNHU, it does not have such a system since it does not have software; everything is done manually and on Excel. The staff in charge of managing MRCs at SoBAPS and ARC had received training on filling out SIGL tools. The warehouse managers at SoBAPS and ARC are transmitting the management activity reports of the MRCs to the management. Regarding the company BGL-SYSMET, the activity reports are sent to management. All these managers stated that they received written feedback on their reports.

- Financial Resources and Service Operations

SoBAPS and the ARC had no debts related to the purchase of the MRCs; for them, the acquisition of the MRCs was done through a prepayment mechanism before delivery from international suppliers and a deposit-with-payment-after-sale (DPAV) contract with national suppliers. According to them, despite significant efforts from the development partners, the government's contribution still needs to improve to cover all needs. Concerning CNHU-HKM and the company BGL-SYSMET, they

are in debt; CNHU-HKM, being a client, owes BGL-SYSMET; the latter, in turn, owes its suppliers like Sysmex, Biomérieux, etc. CNHU-HKM sources from ARC and BGL-SYSMET (thanks to a call for tenders); as for the ARC, it sends its needs every three months (03) to SoBAPS for its supply; SoBAPS, in turn, gets its supply from BGL-SYSMET, which is one of its national suppliers, also thanks to a call for tenders.

Supply Chain Operation Reference (SCOR)

- **Planning and Forecasting**

All four (04) surveyed facilities had the national policy document on essential medicines (MRC), the list of essential medicines, and the list of tracer products (100%). The facilities themselves quantified their needs using management parameters (average monthly consumption, available usable stock, etc.).

- **Procurement and Inventory Management**

In all surveyed facilities, MRC stored on pallets or shelves is protected, separated, and well arranged. Expired and/or damaged products are separated from good products and removed from stock. A physical inventory of stocks is carried out twice a year, once in June and once in December at SoBAPS, ARC, and BGL-SYSMET, while at CNHU-HKM, the inventory is carried out once a year, at the end of the year. Of the four surveyed facilities, only CNHU-HKM had refrigerators for the storage of health products. The storage temperature is between +2 and +8˚.

- **Production and Quality Control**

In all the facilities surveyed, the verification of the ordered quantity of MRC is checked against what is received upon delivery (100%); the expiration date, the integrity of product packaging, and compliance with proper storage conditions are all verified. The MRC packaging is not covered with dust or other dirt and is properly stored.

- **Distribution and Transport**

Regarding distribution, there is the company BGL-SYSMET, which is a local supplier for SoBAPS; then SoBAPS delivers to the ARC quarterly; as for CNHU, it receives deliveries at the ARC. 100% of orders had been delivered within the deadlines stipulated in the contract with suppliers. An MRC distribution plan is operational; a fleet of vehicles for MRC delivery is available. All delivery notes included information about the sender, expiration dates, and batch numbers of all delivered MRCs. Vehicles in good working condition were available with the necessary drivers to meet the distribution plan.

- **Returns and Waste Management**

All warehouses followed the rules for storing expired items by separating them from good products and removing them from stock. There was a procedure for destroying expired and spoiled products. All warehouses had trash bins to manage waste from logistics activities. To reduce waste, redistribution strategies for stocks were carried out before the MRCs expired.

Performance Indicators

The SCOR model (Supply Chain Operations Reference) is widely recognized as the most promising framework for strategic decision-making in supply chains, particularly in the pharmaceutical industry, which has a complex and complete sup-

ply chain. So, we had a composite scale with five (05) dimensions, including both quantitative and qualitative indicators:

- **Supply Chain Reliability**

- Availability rate of medicines, consumables, and reagents

The availability of essential medicines (EM) over the six months prior to our visit ranged from 100% for medicines at SoBAPS and ARC to 50% - 74% at CNHU-HKM; for laboratory reagents and consumables, it ranged from 55% - 69% at SoBAPS, ARC, and the company BGL-SYSMET, and 38% at CNHU-HKM. The availability of EM at each facility, on the day of the survey and over the past six months, is summarized in Table 3.

Table 3. Availability of MRCs on the day of the survey and over the past 6 months in 2025.

Inputs	Structures	Variables	Number of Employees	%
Diagnostic and antimitotic drugs (n = 397)	SoBAPS	Available on the day of the survey	390	98.24
	ARC		390	98.24
	CNHU-HKM		250	62.97
	SoBAPS	Available in the last 6 months	395	99.50
	ARC		390	98.24
	CNHU-HKM		200	50.38
Special drugs and dialysis kits (n = 255)	SoBAPS	Available on the day of the survey	255	100
	ARC		255	100
	CNHU-HKM		200	78.43
	SoBAPS	Available in the last 6 months	255	100
	ARC		255	100
	CNHU-HKM		190	74.50
Laboratory reagents and consumables (n = 2161)	SoBAPS	Available on the day of the survey	1700	79
	ARC		1600	74
	BGL-SYSMET		1900	87.92
	CNHU-HKM		1000	46
	SoBAPS	Available in the last 6 months	1500	69.41
	ARC		1200	55.52
	BGL-SYSMET		1500	69.41
	CNHU-HKM		800	38

- Stockout rate: number of days/year

The stockout rate for MRC within SoBAPS and ARC ranges from 1 to 10 days; within CNHU, the MRC stockout rate ranges from 1 to 30 days or more; at BGL-SYSMET, the rate ranges from 1 to 14 days at most.

Stockout rate = (Number of stockout days/365) × 100 for a one-year period, or =

(Number of stockout days/Total number of days in the period) × 100 for a given period.

- Order accuracy (quantity/quality compliance): 0 - 100%

For this indicator, we followed a few criteria before calculating it: whether the quantity is correct (meaning the number ordered is what we received upon delivery), whether the MRCs are of good quality, the condition of the packaging, and whether the expiration date is near. The orders received at SoBAPS, ARC, CNHU, and BGL-SYSMET are compliant because upon receipt, the receiving committee checked the expiration date; if the expiration date was near, they returned the products or the storekeeper could take a bit depending on the MRC stock going out of their store; the committee also checked Also, the condition of the MRC packaging, whether it's open, dusty, or faulty; the reception committee of these surveyed structures checked the quantity of MRCs and claimed if there was any shortage or not. To conclude, on the day of the survey, for each structure, the number of orders received was without error, and also the reception of orders received within these structures during the six months prior to the collection day was in compliance, so 100% for each structure.

- System responsiveness

- Average delivery time (order-reception)

The delivery time from SoBAPS to ARC and from ARC to CNHU is under 7 days; the delivery time from BGL to SoBAPS ranges from 7 to 14 days; the delivery time from BGL to CNHU-HKM ranges from 7 to 14 days or 14 to 30 days; it all depends on the availability of MRCs.

Average delivery time = Σ(Receipt date − Order date)/number of orders received.

- Efficiency and costs

- Stock turnover

Number of times the average stock is replenished over the course of a year at SoBAPS, CNHU, BGL-SYSMET, and ARC.

The MRC stocks of SoBAPS, CNHU, and BGL-SYSMET were renewed 6 to 12 times per year and more. As for ARC, they are renewed every quarter.

- Loss percentage (expiration, breakage) < 2%

Measures the proportion of losses (expiry, breakage, deterioration, etc.) and the proportion of products lost relative to the total quantity managed over a given period.

- If the loss percentage < 2%: good performance.
- If the loss percentage is 2% - 5%: average performance; corrective actions are required.
- If the loss percentage > 5%: poor performance, indicating problems with inventory management and storage.

The percentage of expired, broken, or spoiled MRCs within SoBAPS and ARC did not exceed 2%; the percentages at CNHU and BGL-SYSMET exceeded the 2% recommended by the standard.

Table 4 presents the MRCs that had expired as of the survey date in 2025. After determining the percentage of losses attributable to MRCs, an inventory was conducted to identify the expired MRCs actually observed during the survey.

Table 4. Expiration of MRC on the day of the survey in 2025.

Inputs	Structures	Variables	Number of Employees	%
Diagnostic and antimitotic drugs (n = 397)	SoBAPS	Number of expired, spoiled, and broken products	5	1.25
	ARC		10	1.76
	CNHU-HKM		90	22.67
Special drugs and dialysis kits (n = 255)	SoBAPS	Number of expired, spoiled, and broken products	0	0
	ARC		0	0
	CNHU-HKM		5	1.96
Laboratory reagents and consumables (n = 2161)	SoBAPS	Number of expired, spoiled, and broken products	5	0.63
	ARC		10	0.67
	BGL-SYSMET		100	6.67
	CNHU-HKM		100	13

Assessment of the performance level of the supply chain management system of MRCs in the public and private sectors in southern Benin in 2025.

The performance assessment was carried out based on the analysis of the different sub-components and components of the MRC supply chain management system in the public and private sectors in southern Benin, according to the scores obtained by each sub-component compared to the expected score, and the results were presented in Table 5 and Table 6.

Table 5. Assessment of the components "Management Support," "SCOR," and "KPI Indicators" as well as their sub-components for evaluating the performance of the SCM system of MRCs in the public and private sectors in southern Benin in 2025.

Components	Sub-Components	Expected Score	Obtained Score	%	Appreciation Rating
Management Support	Human Resources	40	25	63	Grade C: Acceptable
	Infrastructure and Equipment	48	31	65	Grade C: Acceptable
	Technology and GIS	72	60	77	Grade B: Good
	Financial Resources and Service Operations	24	19	79	Grade B: Good
	Management Tools	48	48	100	Gadee A: Excellent
	Total Management Support	**232**	**183**	**78**	**Grade B: Good**
Scor	Planning and Forecasting	24	24	100	Grade A: Excellent
	Supply and Inventory Management	84	69	82	Gade A: Excellent
	Production and Quality Control	32	32	100	Grade A: Excellent
	Distribution and Transportation	12	07	58	Grade D: Low
	Returns/Waste Management	08	08	100	Grade A: Excellent
	Total Score	**168**	**140**	**83**	**Grade B: Good**

Continued

KPI Indicators	MRC Availability Rate	≥95%	85%	Grade B: Good
	Stockout Rate	<5 days	1 - 30 days	Grade D: Low
	Average Delivery Time	<7 days	1 - 30 days	Grade C: Acceptable
	Order Accuracy	0% - 100%	100%	Grade A: Excellent
	Loss Percentage	**<2%**	1% - 13%	Grade D: Low
	Total Indicators KPI			**Grade C: Acceptable**

The components "Management Support," "SCOR," and "KPI Indicators" obtained respective percentages of 78%, 83%, and 65%. Therefore, the performance of the "Management Support" and "SCOR" components is good. That of the "KPI Indicators" is acceptable.

Table 6. Overall assessment of the performance components of SGCA of MRCs in the public and private sectors in southern Benin in 2025.

Components	Expected Score	Obtained Score	%	Assessment Level
Management Support	232	183	78	Grade B: Good
Scor	168	140	83	Grade B: Good
KPI Indicators			60	Grade C: Acceptable
SGCA-MRC Performance	**400**	**323**	**81**	**Grade B: Good**

The performance of the MRCs' supply chain management system scored 81%. So the system's performance is good, but there are still a few points to fix in each component.

4. Discussion

The results of this study showed that the overall performance of the supply chain management system for medicines, reagents, and medical consumables (MRC) in Benin is considered good (75%), although there are shortcomings in performance indicators (KPIs), particularly in availability, stockouts, and losses.

These results were generally consistent with several studies conducted in low- and middle-income countries. Indeed, according to Yadav, pharmaceutical supply systems in these contexts often perform satisfactorily at the organizational level but remain fragile in operational outcomes, particularly in ensuring continuous product availability and reducing stockouts [9].

- **Performance of Management Support**

The score of 78% (good performance) obtained for management support aligns with the conclusions of the USAID Deliver Project (2011) [10]. They point out that the availability of management tools, standardized procedures, and logistics information systems is an essential foundation for improving supply chain performance. However, the lack of staff qualifications observed in our study aligns with the findings of Atinga *et al.* in Ghana, who showed that the lack of specialized training for logistics personnel negatively impacts effective inventory management and decision-making [11].

- **Performance According to the SCOR Model**

The SCOR component shows good performance (83%), which confirms the relevance of this model in evaluating health supply chains. However, the low performance observed in distribution and transportation (58%) aligns with the conclusions of Chandani *et al.* (2012), who identify logistical constraints (transport, timing, accessibility) as major factors causing supply chain malfunctions. Supply in sub-Saharan Africa [12].

- **Performance Indicators (KPI)**

The KPIs show acceptable performance (65%), with several shortcomings: The availability of RMCs (<95%) is below the standards recommended by the WHO, which is also seen in several African studies (WHO, 2019) [13]. Stockouts lasting up to 30 days confirm the observations of Mikkelsen-Lopez *et al.* (2014), who show that frequent stockouts are linked to planning and funding issues [14]. The high loss rate (>2%), especially at CNHU and BGL-SYSMET, is similar to the results of Rao *et al.* (2018), who attribute these losses to poor inventory management and inadequate storage conditions [15]. On the other hand, the accuracy of orders (100%) observed in this study is a strong point and aligns with the conclusions of Chopra & Meindl (2016), who highlight the reliability of receiving processes. Quality control is a key logistics performance indicator [16].

- **Differences between the Public and Private Sectors**

The study highlights disparities between the structures: Organizations like SoBAPS and ARC show better performance. CNHU-HKM shows significant shortcomings (stockouts, losses, lack of logistics information system). These results are similar to those of Bigdeli *et al.*, who show that public hospital structures in developing countries often face financial, organizational, and technological constraints that limit their performance [17]. Practical implications: The results suggest that, despite an overall functional organization, improvements are needed, notably strengthening staff skills, improving the logistics information system (LIS), especially at the hospital level, optimizing distribution and transport, and reducing losses and stockouts. These recommendations align with those of WHO (2021), which advocates an integrated approach that combines governance, digitalization, and capacity building to improve health supply chains [18].

5. Conclusion

This study allowed us to assess the performance level of the MRC supply chain management system in both the private and public sectors in Benin, which is good. This enabled us to confirm our hypothesis about the MRC supply chain. So, what are the factors that explain this level of performance?

Author Contributions

All authors contributed to the conception and design of the study, data collection and analysis, interpretation of the results, and drafting and revision of the manuscript. All authors read and approved the final version of the manuscript.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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