

# Analyzing the Effectiveness of Internal Control Systems in Managing Pharmaceutical Inventories at Advent Hospital Medan, Indonesia

Ropinna Nadia Sormin<sup>1</sup>, Amran Manurung<sup>2</sup>, Magdalena Judika Br Siringoringo<sup>3</sup>

<sup>1,2,3</sup> Department of Accounting, Faculty of Economics and Business, Universitas HKBP Nommensen, Medan, Indonesia.  
Email: [ropinna.sormin@student.uhn.ac.id](mailto:ropinna.sormin@student.uhn.ac.id)<sup>1</sup>, [amran.manurung@uhn.ac.id](mailto:amran.manurung@uhn.ac.id)<sup>2</sup>, [magdalenasiringoringo@uhn.ac.id](mailto:magdalenasiringoringo@uhn.ac.id)<sup>3</sup>

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## ABSTRACT

This study aims to analyze the implementation of the internal control system in managing pharmaceutical inventory at Advent Hospital Medan. Medication inventory plays a crucial role in supporting patient services, both outpatient and inpatient. Internal control is essential to ensure drug availability, prevent overstocking or stockouts, and mitigate risks of damage and expiration. This research uses a descriptive qualitative method, employing interviews and observations within the pharmacy department. The findings indicate that Advent Hospital Medan has implemented internal controls through inventory recording, stock monitoring, and task segregation. However, challenges such as overstocking and the risk of expired medications remain. Therefore, regular supervision and evaluation must be strengthened to optimize inventory management. This study is expected to serve as an input for hospital management and a reference for future research.

**Keywords:** Internal Control System, Pharmaceutical Inventory, Hospital.

## I. Introduction

Healthcare facilities are the backbone of hospital services and are pivotal in meeting the growing public demand for adequate medical care. Providing high-quality medical infrastructure—such as diagnostic equipment, intensive care units, and the availability of pharmaceutical supplies and trained personnel—significantly influences the overall quality of patient services. Although the number of hospitals in Indonesia continues to grow, reaching 3,178 units by June 2024 (Directorate General of Health Services, 2024), disparities in the quality and accessibility of medical services persist. Many hospitals, particularly those located in remote or underserved regions, still struggle with inadequate medical resources. These include limited emergency care facilities, outdated medical equipment, and a shortage of specialized health professionals. As such, improving the distribution and quality of healthcare infrastructure across regions remains a critical national priority.

One of the most essential components of hospital operations is the management of pharmaceutical inventory. A well-managed inventory of medications ensures that both outpatient and inpatient care can be delivered promptly and effectively. The availability of appropriate medications directly influences treatment outcomes, patient satisfaction, and hospital performance. However, pharmaceutical inventory management remains a challenge for many healthcare institutions. Hospitals often face issues such as insufficient stock levels, uneven drug distribution, and the risk of expired medications. These issues are especially prevalent in high-traffic hospitals where patient volume and medication demand are unpredictable. In such cases, poor

inventory control can lead to critical shortages or excessive stockpiles of drugs, which undermine the efficiency of medical services and may lead to financial losses. To address these challenges, hospitals must implement robust internal control systems (ICS) that enable accurate inventory tracking, minimize losses, and ensure the continuous availability of essential drugs. A practical ICS provides a framework for maintaining oversight, ensuring accountability, and enhancing the overall reliability of drug management. Such a system typically includes digital record-keeping, periodic stock monitoring, task segregation among staff, and streamlined communication with pharmaceutical suppliers. These elements work together to prevent shortages, overstocking, and misuse of medications, thus improving operational efficiency and the quality of patient care. Despite hospitals in Indonesia adhering to established pharmaceutical service standards (Ministry of Health, 2016), implementation gaps remain, particularly in the effectiveness of their internal control systems. Inadequate drug recording, poor stock monitoring, and poor coordination among pharmacy units, procurement staff, and suppliers often lead to inefficiencies. These shortcomings can result in procurement delays, medicine unavailability, and increased risk of drug misplacement or theft. Weak internal control mechanisms not only compromise the availability of vital drugs but also pose risks to patient safety and the financial health of hospitals. Internal control systems must be strengthened by adopting technological tools and strict compliance monitoring to mitigate these risks.

The significance of internal control systems in hospitals extends beyond pharmaceutical inventory. They are vital for ensuring that all operational activities are carried out effectively, efficiently, and economically. By safeguarding medical supplies, maintaining accurate financial and inventory data, and ensuring adherence to healthcare regulations, ICS contributes significantly to sustainable hospital management. Moreover, a strong internal control framework facilitates reliable decision-making by hospital management and fosters transparency and accountability across departments. Hospitals are also better positioned to comply with national healthcare standards and audit requirements, thus minimizing legal and financial risks. Empirical evidence from prior studies supports the need for stronger internal controls in the healthcare sector. Hariyanti et al. (2024) identified several inefficiencies in the inventory control practices at Nahdlatul Ulama Hospital, pointing to inadequate supervision and task distribution. Similarly, Awaluddin and Lestari Labangu (2023) found that, although the community health center in Tiworo Kepulauan had adopted COSO-based procedures, there were still issues related to pharmacy task segregation and security. At Dr. M. Yunus Regional Hospital in Bengkulu, Hantini (2020) reported that documentation and security measures were still lacking despite a functioning internal pharmacy system. Maruf et al. (2019) also highlighted weaknesses in access control and inventory recording at Puskesmas Bahu, which raised concerns about potential fraud risks. These studies underscore the need for ongoing evaluation and refinement of ICS in Indonesian healthcare institutions.

Pharmaceutical inventory mismanagement also has direct economic consequences. Overstocking may lead to medication expiration and wastage, while stockouts disrupt patient treatment schedules and force hospitals to engage in costly emergency procurement. According to Gunawan et al. (2023), ineffective inventory planning increases total supply chain costs and indicates inefficiency in resource use. Common contributors to poor inventory outcomes include inaccurate recordkeeping, disorganized storage, and insufficient monitoring during drug distribution. Firman (2022) emphasized that routine stock monitoring and strict task segregation are key components of an effective internal control system, as they help mitigate errors and fraudulent behavior. Furthermore, when drug inventory is mismanaged, the financial burden on hospitals increases, undermining their long-term sustainability and capacity to invest in service quality improvements. As one of the leading private hospitals in North Sumatra, Advent Hospital Medan faces substantial demands in its pharmaceutical operations. With an annual patient load of approximately 144,000 outpatients and 47,000 inpatients, the hospital manages a complex inventory system encompassing 570 items for inpatients, 300 for outpatients, and 7,000 fast-moving drugs every week. Based on interviews conducted with the Head of Pharmacy, several persistent issues were identified, including stock shortages, overstocking, premature drug expiration, and inconsistencies in procurement and distribution processes. These issues hinder the hospital's operational efficiency and compromise its ability to deliver high-quality care. Advent Hospital

Medan has adopted a computerized inventory management system to overcome these challenges. While this digital transition is a step in the right direction, further evaluation is necessary to assess the system's effectiveness and identify areas for improvement. According to Masta Florida and Mesakh (2022), implementing computerized accounting systems has improved drug management in many hospitals, but ongoing assessments are crucial to determine success factors and operational bottlenecks. In today's digital era, web-based inventory systems allow hospitals to monitor drug stock levels in real time, enabling faster and more informed decision-making. Zainudin et al. (2024) found that such systems significantly enhance inventory accuracy and efficiency, allowing hospitals to prevent drug shortages or surpluses and maintain consistent service delivery.

Given these dynamics, conducting a thorough investigation into the internal control practices governing pharmaceutical inventory at Advent Hospital Medan is imperative. Strengthening ICS is essential for minimizing medication waste and procurement delays, ensuring patient safety, enhancing budget efficiency, and improving overall healthcare quality. Therefore, this study aims to analyze the implementation and effectiveness of the internal control system in managing pharmaceutical inventory at Advent Hospital Medan. By employing a qualitative research approach, this study also seeks to identify specific factors that support or hinder the effectiveness of internal controls, offering practical recommendations for hospital administrators and policymakers.

## II. Literature Review and Hypothesis Development

### 2.1. Accounting Information Systems

An accounting information system (AIS) is a structured mechanism that includes forms, records, and reports organized to provide financial data necessary for managerial decision-making (Mulyadi, 2023). According to Purwanti (2024), AIS is a system that records, processes, and reports financial transactions, helping organizations achieve their goals by delivering relevant, accurate, and timely financial information. An AIS is a tool for recording, processing, and reporting financial activities to support effective management and operational efficiency. The general objectives of developing an AIS, as outlined by Mulyadi (2023), include providing information for managing new business activities, improving the quality and structure of financial reporting, enhancing internal control and accounting reliability, and reducing clerical work in accounting processes.

### 2.2. Internal Control System

An internal control system (ICS) is a process carried out collectively by the board of directors, management, and all levels of an organization to ensure operational goals are achieved effectively. COSO (2013) describes internal control as a process influenced by individuals within the organization to provide reasonable assurance regarding achieving objectives in operations, reporting, and compliance. Internal controls aim to ensure the reliability of financial reporting, compliance with laws and regulations, and the efficiency and effectiveness of operations. Munte (2022), Maruf et al. (2019b), and Aulia & Maligan (2022) emphasize that internal control systems serve as safeguards for organizational assets and ensure the accuracy of accounting records while promoting compliance with company policies and legal standards. Internal control systems monitor and protect company operations, ensuring resources are used effectively and goals are met. According to Mulyadi (in Listra Yeni, 2022), the key elements of internal control include:

1. Organizational Structure: Functional responsibilities must be separated.
2. Authorization Systems and Recording Procedures: Proper authority must be assigned for each transaction, supported by appropriate documentation.
3. Healthy Practices: Operations should follow ethical and efficient practices.

4. Qualified Personnel: Employees must possess the competence and integrity required for their roles.

According to Sianipar and Siboro (2017), there are five interrelated components of internal control:

1. Control Environment: Organizational culture, ethical values, and management philosophy.
2. Risk Assessment: Identification and evaluation of financial and operational risks.
3. Control Activities: Policies and procedures, including performance reviews, physical controls, and segregation of duties.
4. Information and Communication: Effective communication of financial roles and internal control responsibilities.
5. Monitoring: Continuous assessment and improvement of control processes.

Internal controls serve several strategic purposes (Mulyadi, 2023; Maruf et al., 2019b; COSO, 2013), including:

1. Protecting organizational assets.
2. Ensuring data accuracy and reliability.
3. Promoting operational efficiency.
4. Supporting compliance with organizational policies and legal frameworks.
5. Enhancing decision-making and reducing risk exposure.

### 2.3. Inventory and Inventory Management

Inventory refers to assets held by a company for production or resale. It includes raw materials, work-in-progress, and finished goods (Sofwan Vidya Syifa et al., 2019). According to Saribu and Nasution (Candra Devi et al., 2024), inventory represents unused resources awaiting further processing, and efficient inventory planning minimizes unnecessary procurement and ensures prompt response to customer demand. Limbong et al. (2024) further highlight the dual nature of inventory as both an asset and a potential liability if poorly managed. As noted by Wagiyo et al. (2020) and Suharti (n.d.), the goals of inventory management include:

1. Ensuring timely availability of materials.
2. Preventing risks related to procurement delays or product damage.
3. Supporting seasonal availability and demand consistency.
4. Ensuring uninterrupted production.
5. Maintaining customer satisfaction through consistent product availability.

As outlined by Devi Martha (2023) and Warren et al., the primary valuation methods include:

1. Specific Identification: Matches each item to its actual cost.
2. Average Cost: Uses the weighted average for all inventory units.
3. FIFO (First-In, First-Out): Older inventory is sold first, which is helpful during inflation for stable profit margins.
4. LIFO (Last-In, First-Out): Newer inventory is sold first, often reducing taxable income during price increases.

### 2.4. Drug Inventory Management in Hospitals

Effective drug planning ensures appropriate drug types and quantities are available, encourages rational drug use, and increases efficiency. In RS Advent Medan, pharmaceutical managers oversee the

planning and procurement process to avoid shortages. Hospitals must manage three inventory conditions: stagnation (overstock), shortage (stock-out), and normal levels. An optimal drug inventory system ensures balanced supply and demand, minimizing expired drugs and supporting operational stability (Jaimega et al., 2024). Effective systems like FIFO and FEFO prevent waste and maintain inventory rotation. According to PSAP 05 (Najiyah et al., 2020), drug inventory includes current assets intended for operational support or community service. Effective inventory management ensures medication availability, prevents shortages or expiration, and reduces storage costs. Controlling drug inventory encompasses availability management, usage monitoring, and handling expired or damaged drugs. Hospitals use stock cards and digital systems to track drug movement, batch numbers, and expiration dates (Subaida & Mahbubah, 2019). Destruction of unusable drugs follows legal procedures, involving documentation and coordination with regulatory authorities.

### III. Research Method

This study employs a qualitative descriptive approach to analyze the internal control system applied to pharmaceutical inventory management at Advent Hospital Medan. Data were collected through interviews with key personnel, including the Head of Pharmacy, Warehouse Manager, and warehouse staff, and direct observation of inventory procedures. Primary data were obtained from interviews and field observations, while secondary data were gathered from hospital documents and inventory records. Data analysis followed Miles and Huberman's interactive model, involving transcription, data reduction, display, conclusion drawing, and verification to ensure the validity and reliability of findings.

### IV. Results and Discussion

#### 4.1. Research Result

##### 4.1.1. Availability Control

Interviews with the Head of the Pharmacy Department at Advent Hospital Medan revealed that drug availability control begins with a detailed planning process based on actual usage data. Special attention is given to fast-moving drugs—those with high turnover rates—along with data on frequently diagnosed illnesses, the number of active clinics, and the volume of patient diagnoses. These indicators classify medicines into essential, vital, and main categories, enabling more accurate and targeted forecasting. In determining the quantity of drugs to order, the hospital reviews historical consumption trends and categorizes inventory into fast- and slow-moving items. Daily issuance and request records are compiled and analyzed to inform ordering decisions for the upcoming period. This ensures that fundamental data rather than assumptions drive procurement. When shortages occur, the hospital initiates a specific protocol. First, the cause of the stockout is identified—whether due to distribution delays, raw material shortages, or other external factors. If the drug is confirmed essential, the pharmacy department seeks alternatives from other distributors or pharmacies. In such cases, the medicine is labeled as a "pending item," patients are informed of the expected arrival date based on distributor estimates. Inventory control involves coordination across several departments: pharmacists, the procurement unit, the head of the pharmacy department, financial supervisors, and the finance director. This multi-departmental involvement supports procedural accuracy and operational alignment.

##### 4.1.2. Usage and Storage Control

The hospital employs a digital inventory system that calculates the average consumption of each medication over the previous three months. This average determines the buffer, optimal, and safety stock levels. For instance, if a drug is consumed at 10,000 units in February, 12,000 in March, and 15,000 in April, the average is used to set May's buffer level. Inventory levels are checked daily against these benchmarks, and

replenishment is triggered if stocks fall below the buffer. The hospital applies the First Expired, First Out (FEFO) method to ensure drug quality and safety. Drugs nearing expiration are prioritized for use, and those with less than three months' shelf life are returned to the distributor. This proactive policy helps prevent financial loss and patient safety risks.

#### 4.1.3. Recording and Reporting

The hospital utilizes a Hospital Information System (HIS) to manage all inventory-related activities, including purchase orders, receiving goods, and distributing medications. The HIS allows real-time tracking and reporting, eliminating the need for manual stock cards. Cross-checks are conducted across departments when a discrepancy arises between the physical stock and system data. If no error is found at the receiving or requesting end, a stock adjustment is performed, subject to an internal audit. Drug procurement budgeting is conducted annually, and expenditure is planned based on projected needs. This allows the hospital to maintain financial discipline while meeting patient care requirements.

#### 4.1.4. Handling Damaged, Lost, or Expired Drugs

Upon receiving deliveries, pharmacy staff inspect the packaging, labeling, dosage form, and expiration dates to ensure order compliance. Only authorized vendors with proper certifications are permitted to supply medications. If drugs are close to expiration (within six months), they are separated and reported to the distributor for return. A formal destruction process is initiated for expired items, including documentation, internal auditors' verification, and coordination with certified disposal agents. Damaged drugs caused by supplier error are returned; otherwise, they are written off following managerial review. Notably, according to staff interviews, there have been no reported medication losses due to theft or unaccounted discrepancies.

### 4.2. Discussion

The findings indicate that Advent Hospital Medan has implemented internal control measures aligned with the COSO framework, particularly in inventory availability, usage control, storage, documentation, and risk mitigation. The planning process based on fast-moving items and diagnosis patterns reflects practical risk assessment and control activities. Rather than relying on estimations, the hospital uses historical data, consistent with COSO's emphasis on data reliability for strategic decision-making. The hospital's approach to stockout situations demonstrates contingency control, highlighting flexibility in addressing supply disruptions. The hospital maintains service continuity by consulting the responsible physician (DPJP) and sourcing externally when necessary—a crucial factor in healthcare delivery. The collaboration among multiple departments in procurement and inventory decisions illustrates a clear organizational structure and segregation of duties, one of the key pillars of internal control. This structure ensures accountability and reduces the risk of fraud or error. In terms of usage and storage, the use of three-month rolling averages for buffer stock planning reflects data-driven decision-making. This method provides a balanced approach between availability and efficiency, avoiding overstocking and understocking. The daily monitoring of inventory demonstrates strong internal oversight. The hospital's ability to ensure that 80% of the following month's stock is available by the end of the current month supports strategic readiness and proactive inventory management. This aligns with the monitoring component of COSO, which advocates for continuous review of operational controls.

Implementing the FEFO method and return policies for soon-to-expire drugs reflects preventive control and asset protection. These practices minimize the risk of expired drugs being administered to patients and reduce financial losses. Additionally, the return process enhances collaboration with distributors, extending the scope of internal control beyond the hospital's immediate operations. From a systems perspective, using HIS for inventory management and reporting reflects the hospital's commitment to

information and communication control. By eliminating manual recording, the hospital reduces the chance of human error and enhances data accuracy and reporting reliability.

The procedure for addressing inventory discrepancies—through cross-checks and internal audits—demonstrates a mature response to operational variances. This systematic handling of errors aligns with the principles of corrective control and audit readiness. The hospital's annual budgeting process for drug procurement illustrates strategic planning and financial control. This structured approach ensures that spending aligns with operational needs and regulatory expectations, supporting sustainable resource allocation. Advent Hospital Medan applies a thorough system of checks, documentation, and verifications for handling damaged, expired, or lost drugs. The visual inspection upon delivery, return of items nearing expiration, and formal destruction process represent comprehensive risk management practices. The involvement of internal auditors and third-party agents in the destruction process reflects adherence to best practices in governance and transparency. The fact that no significant drug losses have been reported highlights the effectiveness of internal surveillance systems. This outcome supports Mulyadi's (2016) assertion that internal control systems must protect assets, ensure operational reliability, and support accurate reporting. Overall, the internal control system at Advent Hospital Medan demonstrates strong alignment with theoretical and regulatory standards. However, ongoing evaluation and enhancement are recommended, particularly in forecasting seasonal demand fluctuations and optimizing predictive systems. Integrating digital systems, organizational structure, and responsive policies has positioned the hospital to manage pharmaceutical inventory with accountability and adaptability.

## V. Conclusion

Effective internal control systems are pivotal in ensuring pharmaceutical inventory management's reliability, efficiency, and accountability in healthcare institutions. This study has demonstrated that Advent Hospital Medan has implemented a robust internal control framework encompassing availability planning, usage monitoring, digitalized reporting, and risk mitigation for damaged, expired, or lost medications. The integration of data-driven planning, standardized procedures, and digital systems reflects the hospital's alignment with the COSO framework and other theoretical models of internal control.

Theoretically, this study reinforces the applicability of the COSO internal control framework in the healthcare sector, particularly in pharmaceutical logistics. The findings support prior literature highlighting the importance of risk assessment, control activities, and information systems in enhancing organizational performance. Furthermore, the case of Advent Hospital Medan contributes to expanding the theoretical discourse on how internal control systems can be operationalized effectively in non-profit, service-based environments such as hospitals. The study also underscores the relevance of Mulyadi's (2016) assertions regarding the strategic role of internal control in protecting assets and ensuring data reliability, providing empirical grounding in a healthcare setting. This research offers practical insights into implementing comprehensive inventory control systems for hospital administrators and decision-makers. Managers should prioritize using historical consumption data for procurement planning, enforce daily monitoring practices, and adopt digital inventory management platforms such as Hospital Information Systems (HIS). The FIFO method and proactive return mechanisms should be institutionalized to minimize waste and safeguard patient safety. Additionally, the study highlights the importance of collaboration among departments—pharmacy, procurement, finance, and quality assurance—to ensure accountability and system integrity. Establishing clear documentation protocols and conducting routine internal audits can further strengthen transparency and responsiveness in pharmaceutical operations. The internal control system at Advent Hospital Medan has demonstrated a well-integrated structure that enhances the hospital's capacity to manage drug inventory efficiently and safely. Applying preventive, detective, and corrective controls ensures that pharmaceutical operations align with service quality goals, financial sustainability, and patient safety standards. However, continuous evaluation, investment in predictive technologies, and policy refinement are essential to remain adaptive in a dynamic healthcare environment. This study is a foundation for further

research into internal control practices across varied hospital settings and offers a model for improving pharmaceutical inventory management in similar institutions.

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