INTEGRATION OF DIGITAL DOCUMENTATION AND INVENTORY SYSTEMS IN HEALTHCARE DELIVERY

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Outline

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1. Paper and Digital Documentation

In the Community Pharmacy setting, there are essentially two types of operational records: patient and inventory records. The essence of documentation is to capture and store critical information for intelligent decision-making that results in efficient, effective, and professional patient care through independent pharmaceutical care or necessary collaboration with other healthcare professionals, as well as the provision of required medications and consumables.

Documentation can be manual, using paper files, which ultimately become bulky and require a lot of space. By converting paper-based records into digital formats, healthcare providers can transform the way they work. Digitalized documentation saves space and makes information instantly accessible. Healthcare professionals can quickly locate and share a file or reference material on a desired information carrier, such as a smartphone, tablet, or computer.

While these tools won't replace the human mind, they facilitate smoother workflows and ensure that healthcare professionals can focus on making informed decisions efficiently.

2. Types of Healthcare documentation

A. Documents

i. Patient information

a. General information – Name, age, gender, marital status, contact address, educational status, occupation, place of work, town/ state of origin, etc.
b. Medical Status/ History – Past and present chronic and acute medical conditions, allergies, and drug sensitivity.
c. Consultation History – Dates and time of visit, medical complaints/issues, medications/ dose/ duration, drug reactions, current medications, diagnostic reports, referrals
d. Linkage History – Medical Specialists (Consultants), Diagnostic consultants, Laboratories, Carer Agencies, Physiotherapists

e. Support Groups - Hypertensives, diabetics, exercise, stress, diet, mental health, addiction, asthma, HIV etc.

ii. Inventory information

a. Procurement – Date, name of vendor/supplier, description of item, batch number, expiry date, quantity purchased, unit cost, selling price, total value of invoice.
b. Stock Status – Items in stock, units, re-order status
c. Pricing policy – Uphold higher prices on restocking or find the average
d. Payment notice – Invoice registration and time due
e. Credit purchases – Limits and duration of credit per organisation, group, family or individual.

B. **Tools**

These assist with decision-making and include reference books (e.g. BNF, Medscape, Martindale, Codex) and algorithms.

C. Educational Materials

These include textbooks, which provide foundational knowledge.

Digitization makes these documents easily searchable, accessible, and reliable. Each end-user benefits from faster access to accurate information. They help to document and organize information for future reference by storing patient data in a structured way, allowing access whenever needed. This improves efficiency and the patient experience by enabling more personalized and timely care.

3. Inventory Management Systems

For healthcare providers, the 'ounce of prevention that is worth a pound of cure' means ensuring the right medical supplies are on hand when medical personnel and their patients need them, because running out of supplies can have fatal consequences.
Inventory management is the process of ensuring that the right products and supplies are available at the right time in the right quantities to meet shifting customer demand—without ordering too much or too little of any particular item. It is necessary to maintain a delicate balance between supply and demand to avoid both inflated costs and lost sales opportunities.

A. Types of Inventory Management

i. Periodic inventory management
This involves counting inventory at regular intervals, such as weekly, monthly, or quarterly. This has the lowest cost but is labour-intensive. Risks are overstocking or stockouts during periods between physical inventory counts.

ii. Perpetual inventory management
This requires inventory management software and automated systems to update inventory in real time as items come and go. This real-time visibility of stock levels often requires an investment in technology and training.

B. Benefits of Healthcare Inventory Management.

i. **Cost Reduction**

Maintaining ideal stock levels lowers expenses in two main ways.

a. Minimized waste**:** This monitors expiration dates and usage patterns to avoid overstocking**,** ensuring supplies get used.
b. Optimized purchasing: Maintaining efficient purchasing processes to maximize cash flow to accommodate the purchase of usually expensive lifesaving medical supplies.

ii. **Accurate demand forecasting and inventory tracking** :

This ensures the ordering of only what's needed, reducing the excess inventory that increases storage costs.

iii. **Enhanced Patient Care:**

Enables the provision of timely and accurate treatments and improves patient outcomes.

iv. **Better availability of supplies:**

Essential items such as medications, surgical instruments, and medical devices are always in stock, enabling providers to deliver prompt and uninterrupted care.

v. **Improved accuracy:**

This removes worry about having the wrong drugs or instruments in stock or running out of them so that the focus is on patient care.

vi. **Improved Efficiency**

Closely tracking medical supplies and optimizing their use, facilitates focus on improving the efficiency of facility operations while delivering quality care to patients. This efficiency boost is achieved in two ways.

a. **Streamlined operations:** This reduces patient wait times and boosts job satisfaction workers.
b. **Quick inventory audits: I**nventory audits are completed in a fraction of the time it takes manually. Accuracy of inventory counts is improved, saving time and aiding quick identification and resolution of discrepancies.

VII. **Accurate recordkeeping:**

There are detailed records of inventories such as purchase and expiration dates and usage data. This process is automated to keep information up to date and easily accessible, helping organizations pass regulatory inspections, avoid penalties and maintain the highest safety and care standards.

viii. **Traceability:** Tracking the history and location of each inventory item from purchase to use, is particularly important to manage product recalls, investigate issues, and maintain the integrity of supplies, aiding compliance with regulations while maintaining patient safety.

ix. **Data-Driven Decisions**

Decisions based on accurate data, boost operational efficiency, reduce costs, and improve patient care. Advanced inventory management systems can facilitate data-driven decisions by providing:

a. **Inventory analytics:** Analyzing patterns and trends in inventory usage helps identify inefficiencies and areas for improvement. Eliminates waste from over-ordering, ensuring more efficient use of resources.

b. **Forecasting:** Better visibility of inventory levels and usage patterns enhances accurate demand forecast for medications and equipment. These techniques help organizations deal with potential shortages or supply chain issues before they become critical.

x. **Enhanced Security**

The best inventory management systems and processes help healthcare organizations implement stringent security measures to protect valuable supplies and make sure that they're used appropriately. For example, advanced systems can allow for:

xi. **Controlled access:** Access should be restricted to certain medical supplies and drugs to prevent theft and irresponsible use. To reduce the risk of theft, misuse, or accidental loss, storage areas can be secured with automated dispensing systems to limit access to authorized personnel only.

xii. **Inventory tracking:** By knowing exactly where each item is located and how much is readily available at any given time, healthcare providers can maintain tighter control over their supplies and prevent potential security breaches.

xiii. **Improved Supplier Management:** Collaboration with suppliers can create more transparent interactions, gain favourable terms, and develop supply chains that can withstand disruptions.

xiv. **Better relationships:** Developing clear communication plans and reliable ordering patterns is a sure way to build strong supplier relationships. Well-managed inventory leads to more consistent and accurate ordering, allowing a steadier flow of the necessary supplies that are crucial for maintaining high-quality patient care.

xv. **Negotiation leverage:** A clear understanding of inventory needs and purchasing patterns, builds confidence when engaging in supplier negotiations. This leverage can lead to cost savings and more favourable contract terms, boosting a company's bottom line and its ability to maintain essential items.

xvi. **Information Sharing:** Shared real-time data with suppliers, enables them to plan production and delivery schedules more effectively.

C. Environmental Benefits

Effective healthcare inventory management can contribute to environmental sustainability by reducing waste, the number of required deliveries, and the resources required to store stock—all reducing an organization's carbon footprint.

4. Goals of Healthcare Delivery

The primary goal of healthcare delivery is to provide accessible, high-quality, and cost-effective care that improves patient outcomes, promotes overall well-being, and ensures financial protection against medical hardship for everyone.

Healthcare delivery systems are guided by the "STEEEP" framework, which focuses on six core domains to achieve these objectives:

i. **Safety:** Minimizing medical errors, preventable infections, and harm to patients during treatment.
ii. **Timeliness:** Reducing wait times and ensuring care is delivered promptly when needed.
iii. **Effectiveness:** Providing evidence-based, scientifically proven medical care that yields the best possible health outcomes.
iv. **Efficiency:** Optimizing resources to avoid waste, reduce unnecessary procedures, and deliver cost-effective care.
v. **Equity:** Ensuring that all individuals—regardless of financial status, geography, or background—have fair access to necessary care and health services.
vi. **Patient-Centeredness:** Respecting individual patient preferences, needs, and values, and ensuring they are active participants in their care.

5. The interconnectedness of digital documentation, Inventory systems and the efficiency as well as effectiveness of healthcare delivery

A. **Real-time Consumption:** As medical personnel records the use of a surgical kit or administers a drug in the EMR (Electronic Medical Record), this usage data passes in real time to the hospital's supply chain or enterprise resource planning (ERP) system.
B. **Smart Cabinets & RFID:** Smart storage units and **RFID tags** automatically log when an item is removed and verify it against the specific patient's chart.
C. **Predictive Forecasting:** The system utilizes historical data and usage rates to predict future demand, automating purchase orders and optimizing stock levels.

6. Key Platforms and Considerations for integration

A. Implementation Resources: Integrating clinical systems with supply chain ERPs (like those offered by Oracle Supply Chain Management) or dedicated healthcare tracking platforms (such as Wasp Inventory Cloud and Bacancy HIMS) drives this operational shift.
B. Data Security & Compliance: Integrations must rely on standardized data protocols like Health Level Seven (HL7) to ensure secure, compliant, and accurate data sharing
C. **Consignment inventory models**: Suppliers retain ownership of inventory until items are used, can also play an important role, reducing the financial burden on healthcare

facilities by providing a steady supply of essential materials while reducing the risk of over-purchasing.

D. **Health organizations can also benefit from cloud-based inventory management systems:** These offer real-time access to data and integrate with other healthcare facilities to coordinate care across organisations, improve response times, and get supplies in the hands of healthcare professionals before an emergency occurs.

7. The Benefits of integration

i. **Automated Supply Tracking:** Eliminates manual stock counts and reduces human error by **tracking the exact movement** of medical devices and pharmaceuticals.

ii. **Demand forecasting** tools that can accurately estimate the need for critical medical inventory by analyzing historical usage data, seasonal trends, and emerging health threats. This ensures that supplies are always available when needed, especially for emergencies, without having to pad orders and tie up capital in excess inventory.

iii. **Workflow Efficiency:** Minimizes duplicate data entry and administrative burdens, **freeing up healthcare professionals to spend more time on direct patient care**.

iv. **Patient Safety:** Lowers the risk of expired medications being administered and prevents stockouts of critical, life-saving supplies.

Medical personnel document a procedure or medication in an Electronic Medical Record (EMR), inventory is automatically updated, triggering low-stock alerts and streamlining procurement.

8. **Conclusion**

Connecting electronic health records with other healthcare systems is essential for building a healthcare ecosystem that works better for both patients and providers. Patients benefit from faster, safer treatment, while providers gain access to the full picture of patient health, all in one place. This also helps to build a more cohesive healthcare ecosystem.

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