

Materials Management Information Systems: Perspective

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Datapro Summary

Business-to-business (B2B) e-commerce is transforming the way care delivery organizations manage the procurement and payment of supplies. As traditional materials management information systems give way to Web-enabled supply chain management (SCM) applications, CDOs are realizing lower supply costs, faster delivery, and streamlined procurement and payment processing. SCM expands materials management beyond the boundaries of the CDO to encompass suppliers, distributors, and manufacturers.

—By *Barbara A. Kelly*

Technology Basics

Materials management information systems (MMISs) automate the continuous cycle of supplies procurement and usage throughout the care delivery organization (CDO). Traditionally, MMISs have included the following functional modules:

- Requisitioning--including online requisition generation and approval.
- Ordering--purchase order (PO) generation and EDI or Web-based transmission to vendor.
- Receiving--receipt generation and tracking.
- Distribution--tracking where and when supplies are dispersed throughout the organization.
- Usage--including usage tracking and charging of supplies to patient accounts.
- Invoice and payment processing--invoice tracking, EDI or Web transmission of payments, and forwarding of financial data to the general ledger system.
- Inventory management--support for just-in-time or par-level inventory and automatic requisitioning when supplies drop to user-defined levels.
- Vendor database--bidding, contract management, and online vendor supply catalogs.
- Management reporting.

Supply Chain Management

CDOs have embraced material management because of its potential for tremendous cost savings within virtually every department. Many CDOs have implemented materials management applications as part of an overall enterprise resource planning (ERP) solution. ERP product suites automate back-office functions, such as general-ledger, accounts payable, fixed assets, budgeting, human resources, and payroll, in addition to materials management. In the 1990s electronic data interchange (EDI) and just-in-time inventory (JIT) changed the way MMISs were used to order, purchase, and distribute supplies across the enterprise. Now, supply chain management (SCM) solutions are replacing MMISs.

SCM significantly improves the manner in which CDOs manage procurement and payments. SCM involves all parties within the supply chain, not just the CDO. With SCM, the system can alert an outside supplier or manufacturer when a predetermined par level is reached. It can create and electronically transmit a requisition to the CDO's supplier via electronic data interchange (EDI) or over the Internet (e-commerce) and can pay the invoice in the same manner. Interfaces to the CDO's financial systems allow the materials management application to automatically update the accounting department. When materials management is implemented as part of an overall SCM strategy, CDOs realize the following benefits:

- Cost containment and access to more detailed information about supply cost and usage.
- Faster turnaround between ordering supplies and receiving them.
- Increased connectivity with outside distributors, suppliers, and manufacturers.
- Simplified procurement processes.

Electronic Data Interchange (EDI)

Before Web-enabled applications entered the market, CDOs supplemented or replaced manual ordering and payments to outside sources with electronic data interchange (EDI). EDI is the exchange of electronic documents between suppliers/manufacturers and users such as CDOs. EDI consists of standardized electronic message formats, called transaction sets, for common business documents, such as Request for Quotation, Purchase Order, Purchase Order Change, Bill of Lading, Receiving Advice, and Invoice. The electronic transaction sets enable the computer system in one organization to communicate with another organization's system directly or via e-mail. Paper documents and the human effort required to read, sort, and physically transport them are eliminated, as is the manual keying of information. Office or warehouse space that normally would be occupied by paper files can be allocated for other uses. Manual filing by clerical staff is eliminated.

When selecting EDI software or an MMIS with built-in EDI capability, it is important to ensure the application is compatible with ANSI X12 standards. The X12 Committee of the American National Standards Institute (ANSI) developed the voluntary standards for use by U.S. businesses. One of the most common uses of EDI among CDOs is for

purchase orders and resultant invoices. Trading partners subsequently issue payment for goods or services received. The ANSI X12 Payment Order/Remittance Advice transaction set enables payments to be made by transferring funds from the buyer's bank to the seller's bank.

Data security is maintained through the use of unique user identification numbers and passwords assigned by the business partners. Generation/translation software includes extensive data editing and error-checking routines. This ensures that the data is valid when transmitted and received. The standards also allow the receiver to acknowledge successful receipt of the transmission by sending a functional acknowledgment.

Mobile Data Entry and Retrieval

Portable computing devices, including handheld, pen tablet computers and voice-activated PCs, as well as wireless local-area networks (LANs), have made MMISs easier to use. Pen- and voice-based systems help increase productivity for clinicians and others who may lack typing skills or the time required to enter information into the system via keyboard. Rather than entering data at a desktop workstation, nurses, laboratory and radiology technicians, operating room staff, pharmacists, and other users in ancillary departments can access information at the point of use.

Financial System Interfaces

The MMIS must efficiently communicate with the CDO's general ledger, accounts payable, and other financial systems. ERP software vendors market materials management or procurement applications as part of a product suite that includes general ledger, accounts payable, and budgeting modules. Many also incorporate human resources (HR) management and payroll. Unless a CDO is in the market for such an ERP solution, it will require an MMIS that can seamlessly exchange information with legacy financial systems. The process is easiest when the same vendor has provided both the financial and the materials management software. When the general ledger or accounts payable software operates on the same hardware platform as the materials management system, information sharing is also facilitated.

Clinical System Interfaces

Interfacing capabilities must also include clinical information systems for charge capture, requisitioning, and inventory. If the MMIS is HL7 compliant, the task of writing special interfaces to clinical systems is made easier. When used to maximum capability, the MMIS should interface to the computerized patient record (CPR) system (if one is in place) and to all clinical information systems implemented within the organization. These include the following:

- Enterprisewide healthcare information system (HIS)
- Clinical information system (CIS) in acute and critical care units and in the emergency room
- Pharmacy

- Radiology
- Surgery
- Laboratory

Technology Analysis

Business Use

MMISs can significantly improve the way CDOs automate supply requisition, purchase, receipt, storage, and distribution. EDI and Web-based transmission of purchase orders, remittances, and accompanying documents between suppliers and CDOs expedites the speed and accuracy of payments and deliveries. MMISs control the flow of supplies and corresponding information throughout the CDO. Materials management software significantly improves the way a CDO manages clinical and nonclinical inventory and determines when to replenish supplies. EDI has evolved from mere paperless ordering to include invoicing and management of the CDO's relationships with suppliers and distributors.

Materials management encompasses all areas within the organization. Purchasing/accounting, patient registration, nursing stations, laboratory, radiology, pharmacy, operating room, medical records, laundry, housekeeping, mailroom, and kitchen/dietary planning are among the many functional groups that can benefit from an MMIS. Materials management is an unending cycle of requisitioning, purchasing, receiving, storing, and distributing supplies. A well-implemented system can demonstrate an ROI and save the CDO additional money annually by controlling expenses and maintaining a JIT or stockless inventory. MMISs improve patient care by automatically requisitioning supplies or by alerting users when volumes are low. An SCM solution can be used to order supplies from predetermined vendors over the Internet. The technology improves worker productivity by reducing the paperwork and time associated with manual supply requisitioning. Inventory management also includes forecasting of required supplies, based on recorded usage. This is a convenience feature for all types of supplies and a critical feature for perishable supplies or those in high use in clinical environments.

Healthcare executives must reduce costs as well as increase revenues in order to maintain profitability. An MMIS' greatest advantage to a CDO is cost savings. Other benefits--such as accessibility of vital supplies and improved work processes for staff members--all support the primary benefit of bottom-line improvement. An MMIS reduces the amount of costly storage space required to warehouse supplies not needed in the short term. It allows administrators to track the price, distribution, usage, and location of individual supplies. It enables users to more readily identify which vendors provide the best prices and delivery response times. It permits the organization to charge supplies directly to patient accounts in a timely manner. It can help contain costs by automatically soliciting vendor bids and making purchase recommendations.

Selection Guidelines

Every system evaluation should include hands-on experience with the application software to experience the look and feel of the user interface. It is imperative to contact other user organizations for their opinions on the software's functionality and the vendor's service and support. CDOs should also consider the following guidelines when critiquing a particular vendor's MMIS or SCM solution.

Internet Connectivity

Internet connectivity is essential to the implementation of an SCM solution. This includes the ability to communicate with suppliers over the Internet--including transmission of POs, receipts, invoices, contracts, and payments, and online access to vendor catalogs. Authorized users within the CDO should also be able to access information regarding stock levels, supply distribution and location, and payment information over a corporate intranet. User organizations should select only a Web-enabled MMIS or SCM system that meets their specific requirements.

Vendor Expertise in Healthcare Industry

Most companies that market SCM software, which includes materials management applications, have healthcare organizations on their customer lists. Healthcare users can include payor as well as provider organizations, along with pharmaceutical companies. Expertise in meeting the specific requirements of hospitals and integrated delivery systems (IDSs) varies with each vendor. When evaluating the SCM product line, users should request the names of other CDOs similar to their own in terms of hospital bed size, number of entities, and types of entities.

Enterprisewide Information Processing

Many CDOs that consist of multiple entities have consolidated the purchasing process. When selecting an MMIS or SCM provider, it is important to choose one that supports consolidated, multiple-site processing either through a centralized database or through integration of item and vendor master files. The software should support deliveries and inventory management at multiple sites, rather than at one, central location.

A relational database management system (RDBMS) and a flexible report writer enable users to perform ad hoc querying and customized reporting. The system's reporting capabilities should enable users to create standard and customized reports for their specific departments or entities. It should allow authorized users at higher levels within the organization, such as the Materials Manager or CFO, to generate reports that consolidate information from selected entities or all entities.

Handheld Computers

Many CDOs find portable PCs, such as pen-tablet devices and laptops, beneficial at nursing stations, patient rooms, and other locations where larger desktop workstations would occupy too much space or interfere with clinical work. Handheld PCs, as well as bar code scanners, provide a means of charging supplies to patient accounts at the point of care. Users should ascertain the system's support for the types of handheld devices

they plan to use and the vendor's level of support during initial system configuration and on an ongoing basis.

Just-in-Time Inventory

JIT, also known as stockless inventory, allows CDOs to store only the supplies they require in relatively short, predetermined time periods. It enables the CDO to put the space previously occupied by large inventories to use in a more effective or profitable way. (For example, a large supply room on a medical/surgical floor could be converted into a patient room.) More importantly, a well-designed MMIS with JIT capability can alert clinical departments when supplies are low and reorder them automatically. This feature provides not only cost savings, but also improved quality of care by allowing clinicians to spend more time with patients and less time requisitioning supplies.

Insight

CDOs must evaluate legacy MMISs, and most likely upgrade or replace them with Web-enable SCM solutions, in order to maximize supply cost reduction on an enterprisewide basis. Users should examine a software vendor's track record for providing Web-based solutions to healthcare provider organizations and its demonstrated capability to support the pharmacy, operating room, nursing units, dietary department, and other areas specific to CDOs. Additional product selection criteria include support for charge capture at the point-of-care, multiple-entity information processing, and the ability to interface with existing financial and clinical systems.