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ERP Systems Can streamline Healthcare Business Functions

Healthcare Financial Management , May, 2001 by Elizabeth K. Jenkins, Eric Christenson

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Enterprise resource planning (ERP) software applications are designed to facilitate the systemwide integration of complex processes and functions across a large enterprise consisting of many internal and external constituents. Although most currently available ERP applications generally are tailored to the needs of the manufacturing industry, many large healthcare systems are investigating these applications.

Due to the significant differences between manufacturing and patient care, ERP-based systems do not easily translate to the healthcare setting. In particular, the lack of clinical standardization impedes the use of ERP systems for clinical integration. Nonetheless, an ERP-based system can help a healthcare organization integrate many functions, including patient scheduling, human resources management, workload forecasting, and management of workflow, that are not directly dependent on clinical decision making.

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Enterprise resource planning (ERP) systems are a new type of software that enables companies to integrate business functions—including finance, human resources, operations, sales and distribution, and marketing—across their organizations. Companies throughout the world are increasingly converting to these systems. Major corporations that have implemented ERP systems in recent years include IBM, Microsoft, Eastman Kodak, and Hershey. Purchases of ERP systems reached \$10 billion in 1997, a 40 percent increase from 1996, and industry analysts suggest that rapid growth is likely to continue through 2001.[a]

To date, the growth of ERP systems has been concentrated in the manufacturing sector, but large healthcare systems have begun to take an interest in these applications. As a result, vendors are developing ERP applications that offer administrative and logistical solutions for large healthcare systems.

The key question for a healthcare provider is whether an application originally designed with the manufacturing industry in mind, focusing as that industry does on management of production lines and logistics, translates well to the healthcare industry, which focuses primarily on managing staff costs and clinical processes. Indeed, it is reasonable to assume that because healthcare providers have inherently different cost concerns and behaviors than manufacturers, successful implementation of an ERP system in a healthcare organization would require a quite different approach than that used by manufacturers.

Production Lines versus Patient Care

A comparison of the chief characteristics of the manufacturing and patient care processes discloses several important differences between these processes that shed light on how an ERP system needs to be adapted for use in health care.

The basic focus of the manufacturing process is to transform raw materials into finished goods. In a typical production

line, inventories for raw materials, work in process, and finished goods must be coordinated with production schedules to minimize working capital investment. In essence, the raw-material inventories are stocked and production schedules developed to produce inventories of finished goods needed to meet sales forecasts.

An ERP system can help a manufacturer integrate and coordinate all of the functions of the manufacturing process using standard messaging formats that allow data to be shared among all internal and external constituents in the supply chain. For example, an ERP system enables a manufacturer to use data on expected sales and customer needs from sales-management and customer-service systems within the production-management process to more accurately forecast inventory requirements. The manufacturer's sales department then can use the finished-goods forecasts to manage customer expectations and focus sales efforts. An ERP system also can be used to facilitate the manufacturer's sharing of inventory and sales forecasts with key suppliers, which can use the data to more effectively meet the manufacturer's needs.

By contrast, costs in a healthcare organization are much more difficult to forecast because a healthcare provider must manage many different processes, each having different, and often unpredictable, outcomes. Indeed, the treatment of every patient varies to some degree in terms of processes, staffing, and facility usage.

In addition, because healthcare delivery processes tend to be labor-intensive, the primary cost driver for healthcare organizations is labor, unlike manufacturing, where the primary cost driver is raw materials. Thus, although healthcare providers, like manufacturers, need to optimize their return on assets, their primary focus must be on managing staff and care processes. Therefore, their ERP systems must be designed with these functions in mind.

The complexity of the healthcare industry also adds to the challenge for healthcare organizations that wish to convert to using ERP systems. Health care relies upon a network of relationships between physicians, hospitals, laboratories, insurance companies, government agencies, employers, and patients, and all of these relationships must be accounted for in the ERP system. In addition, large healthcare systems must coordinate the activities of various provider entities that may have significantly different resource requirements.

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Most large healthcare systems have struggled for years to find effective ways to accomplish systemwide integration of staffing and patient care processes. Many of these organizations have viewed consolidation of entities as the only viable way to maintain control over staffing resources and nonhospital-based care providers. Yet this approach often has led to costly, failed investments in physician practices, laboratories, and other organizations.

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Too often, the consolidation efforts of providers have resulted in IDSs that are integrated in terms of ownership only. The inability of IDSs to coordinate care processes is largely due to a lack of data standards and organizationally focused information systems. Although the development of messaging standards like EDI and HCL has allowed the development of interface engines as a conduit of transactional purchasing and patient data, the lack of a standard medical record has impeded the development of truly coordinated healthcare information systems.

In many ways, the implementation of an ERP system across the healthcare continuum depends on the development of such a standard. Until medical record standardization exists, physicians and physician groups will find the cost of ERP implementation too prohibitive and the return marginal.

In addition, implementation of an ERP application that can facilitate effective management of resource utilization in clinical processes remains impractical because clinical processes vary considerably from physician to physician and patient to patient. Nonetheless, there is a significant justification for an ERP application to integrate nonclinical and ancillary healthcare processes, including patient scheduling, supply chain management, accounting, accounts payable, payroll, human resources, laboratory and pharmacy services, and executive information systems. Many of these provider processes are similar to those used in manufacturing, making it feasible to adapt ERP systems for use by the healthcare industry. Moreover, the application of ERP systems for such processes may be an important first step toward effective forecasting of resources required for clinical processes based on clinical profiles.

Application of ERP to Health Care

An ERP application can facilitate a healthcare provider's adoption of processes that manufacturers routinely use to balance workload with corresponding labor and supply requirements, thereby significantly improving the delivery of care. These processes include:

- * Forecasting workloads;
- * Managing human resources; and
- * Identifying specific workflows.

Forecasting workloads. As in manufacturing, forecasting workloads in health care is key to balancing resources. Currently, many departments within healthcare organizations routinely use methods to predict workloads. Many surgery departments, for example, routinely call surgeon's offices to find out how many patient visits are scheduled for the next week and use those data to anticipate patient volume in the two weeks following the patient visits, based on the premise that surgical procedures typically are scheduled within two weeks of a patient's visit. Inpatient nursing units also look at the surgery schedule to determine the number of patient admissions that are scheduled for the next week. Each inpatient unit's volume forecasts then can be translated into potential workload for ancillary departments like the clinical laboratory and pharmacy.

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The challenge of using such forecasts with optimum effectiveness lies in gathering the information at a central location and disseminating it to the appropriate areas of the organization. ERP systems can facilitate information access by collecting and storing historical information in a standard format that is readily accessible to all departments. By providing a central repository for information on inpatient admissions, for example, useful information would be available on a timely basis to other departments for forecasting workloads. This use of an ERP system for centralized scheduling is illustrated in Exhibit 1.

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Centralized scheduling would allow patients from all entities (physicians' office, hospital, or emergency departments) to be assigned to nursing units based upon current diagnosis. Staffing resources then could be allocated based upon patient diagnosis and acuity. If the hospital were unable to meet the staffing needs of the patient, the physician could be notified for appropriate action, such as admission to another facility or postponement of elective surgery. If staffing were adequate, then the patient's location could be communicated to the physician.

Finally, centralized scheduling would facilitate confirmation of all payment arrangements based upon third-party coverage. The resulting output from the central system would be improved forecasts for unit occupancy staffing needs, payments, patient diagnosis, and average length of stay.

Managing human resources. By linking workload information to the scheduling and staffing systems, an ERP system can facilitate dynamic management of human resources throughout a healthcare system--at least to the extent that the system has flexible staffing. An ERP system would allow department managers to link staffing matrices with time-and-attendance data for each shift, thereby allowing productivity reporting on a shift-by-shift basis. Improved staffing efficiency could result in a significant financial benefit, given that labor costs can represent more than 50 percent of a healthcare provider's total costs.

The frequency of workload data reporting required to forecast staffing requirements is likely to vary depending upon the health system's service areas. For example, weekly or monthly workload reporting may be sufficient to set staffing schedules for inpatient departments. On the other hand, the variability of the outpatient population may make it necessary to obtain daily updates of anticipated workloads to determine the staffing of outpatient departments for each shift.

Identifying specific workflows. The key driver of all variable healthcare costs is the utilization of resources in providing care. Effective management of healthcare workflow ensures that resources are used with optimum efficiency.

Healthcare workflow depends on many different clinical and business factors. In essence, each patient requires a unique workflow based on the combination of his or her clinical needs, physician's preference, and the business rules.

imposed by the applicable insurance company or government funding program. For this reason, a healthcare system must be able to customize the way each patient moves through the healthcare delivery continuum. To the degree that a healthcare system can accomplish this customization, it can reduce the cycle time for inpatient care, while efficiently managing outpatient processes.

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Although some ERP applications are purporting to manage healthcare workflow, integrated applications have yet to be developed to facilitate management of the processes involved in moving patients through the healthcare system (eg, admitting, discharge, transfer). Nonetheless, currently available ERP systems can facilitate the creation of custom workflows for each patient by establishing common links among physician offices, the emergency department, the hospital admission process, and all other departments and entities (eg, nursing homes) throughout the care delivery system.

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One benefit of such links is the elimination of unnecessary admissions or costly treatments that occur due to lack of coordination. If a patient cannot be treated at a physician's office at a specific time, for example, the patient may be unnecessarily sent to the emergency department. The centralized scheduling function of the ERP system would allow the physician's office to direct the patient to a less costly treatment option.

ERP applications also could be used to speed the collection of data required to bill and collect from payers. The links between physician offices and the hospital would make it easy for both parties to maintain and update the data required for billing. When patient information changes, for example, the physician office could simply e-mail or fax the change to the health system's ERP system manager. In addition, changes in payer policies could be shared among all providers in a timely manner.

Finally, an ERP system is well suited to handling a healthcare organization's purchasing and distribution functions. Healthcare supply distributors long have been aggressively integrating purchasing and distribution functions, and have developed department-based distribution units, EDI-based ordering and fulfillment systems, and online ordering and authorization capabilities. Often these systems have been stand-alone materials management systems and not part of the hospital's information infrastructure. A healthcare ERP system has the potential of integrating these systems with a healthcare organization's other administrative systems, though such a system has yet to be developed.

Costs and ROI of ERP Systems

Due to the complexity of the multiple relationships that ERP systems must manage, the systems are expensive and complex to install and implement. Infrastructure changes would require certain autonomous department functions in the hospital to be centralized into a core unit for resource allocation, bed-and-board control, payment verification, and communication with physicians.

The issues involved in making such infrastructure changes for health care are far more complex than those for manufacturers. Health care is highly regulated by both Federal and state agencies, and such regulation can have an effect on how the infrastructure changes can be made. The costs of implementation will vary significantly depending on

factors such as the organization's size, the complexity of its information system, the degree to which its current processes are automated, and the integrity of its current scheduling.

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Manufacturers justify the investment on the basis of an ERP system's ability to manage complex supplier relationships and increase their return on physical and human assets. By embedding business processes within the application, equipment is kept running at full capacity, while employees have easy access to the information they need to do their jobs.

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Healthcare providers can justify the expense by the improvement in communications created among entities involved in the delivery and payment of health care and by the substantial cost savings in billing and resource allocation that are possible. Such cost savings could be achieved, for example, by capturing all information in a single billing cycle rather than rebilling on obsolete information or by improving resource allocation based on the projections from centralized scheduling. Cost also could be reduced through better scheduling of ancillary services, such as laboratory and physical therapy, based upon diagnosis retrieved from centralized scheduling. In general, given the extent of the opportunity for cost savings, it would not be unreasonable for a healthcare organization to expect an investment payback in three to five years.

Conclusion

Theoretically, proper implementation of an ERP system can vastly improve a healthcare enterprise's information systems by improving coordination of patient care and administrative processes. The level of integration that can be achieved using such a system is continually evolving, allowing greater coordination of multiple functions with minimal input of data. In addition, while large ERP vendors are entering the healthcare market and refining their products with each installation, smaller vendors and systems integrators are developing focused products that offer specific functionality on a departmental basis.

Despite these developments, the cost and complexity of installation of an ERP system remain serious impediments to adoption of this technology in the healthcare setting. Before purchasing an ERP system, therefore, a healthcare provider should perform a detailed cost-benefit analysis of the potential system, looking at system and consulting costs of implementation, projected installation time, system flexibility for unique patient needs, user interfaces, reliability and integrity of the system, and change management needs. Senior management also should review information on best-practice applications that have a demonstrated ability to facilitate business functions, such as forecasting, human resources, and workflow management.

Finally it is essential that a provider have a clear idea of the core business processes that it intends to integrate with the ERP system and a thorough understanding of how the ERP system can be used to accomplish that integration. If a healthcare organization cannot identify clear, immediately achievable objectives for implementing an ERP system, investment in the technology probably should be delayed until it has a more proven track record in health care.

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(a.) Martin, M. H., "Smart Managing," Fortune. February 2, 1998, pp. 149-151.

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