

# Systems Implications Of Alternate Site Healthcare

BY JOHN R. NORDIN

## Executive Summary

*Hospitals have traditionally been centralized healthcare organizations that either stand alone or belong to regional healthcare networks. The typical hospital provides a wide range of offerings to the community, attempting to be a "full-service" provider through such services as acute care, maternity, surgery, emergency/trauma and a variety of outpatient services.*

*However, increasing costs coupled with advancing medical technology has prompted the rapid development and growth of non-hospital based healthcare alternatives. These alternate site healthcare (ASHC) ventures are demanding both traditional and new applications of information technology. This article explores the ASHC business environment and the implications for IS.*

An explanation of alternate site healthcare (ASHC) is best made by first examining the traditional hospital environment with which ASHC both co-exists and competes.

Hospitals have traditionally been centralized healthcare organizations that either stand alone or belong to regional healthcare networks. The typical hospital provides a wide range of offerings to the community, attempting to be a "full-service" provider through such services as acute care, maternity, surgery, emergency/trauma and a variety of outpatient services. Hospitals typically derive the bulk of their patient revenues as a result of admissions by doctors who are affiliated with the hospital or on staff.

This approach to healthcare has been supported mainly through highly vertically integrated systems, aligned with the centralized nature of the business. Applications running under this hospital information system (HIS) concept include financial services, billing, medical record, clinical services, human resources and materials management systems. Proprietary as well as commercial software solutions have long been available for these applications across all major hardware platforms.

During the last decade, changes in healthcare reimbursement and medical technology, as well as generally escalating costs,

have made certain services economically unattractive to hospitals. Non-acute care such as long-term intravenous nutrition, antibiotic and chemotherapy services have been "outsourced" to non-hospital-based providers, allowing hospitals to concentrate their offerings on acute and emergency/trauma care.

## The Alternate Site Environment

Alternate site healthcare is a broad characterization of all healthcare options that are not hospital-based. This market has been created by the increasing costs associated with hospital-based care and healthcare in general. Lower operating costs, patient convenience and advances in medical technology have all contributed to creating an expanding, multi-billion dollar market.

The typical ASHC organization is an extremely competitive business operating within a restricted geographic area much like a hospital. Many local providers, however, are part of a larger enterprise, some of which are nationwide. Patient revenues are derived primarily as a result of referrals from doctors seeking non-hospital-based options for their patients. Insurance companies, attracted by the lower cost of care, are also recommending that the healthcare provider be non-hospital-based when clinically appropriate. As

with most healthcare organizations, the majority of the revenue is billed to and collected from insurance companies.

The alternate site market is comprised of many providers offering many different services. A typical cross-section of ASHC services would include home infusion therapy, physical therapy centers, ambulatory care centers and home monitoring.

## Home Infusion Therapy

The Home infusion therapy industry supports patients who have been discharged from the hospital (or, in some cases, were never hospitalized) and require short-term, intermediate or long-term intravenous infusion. The major therapies offered include liquid nutrition, antibiotic, pain management and chemotherapy.

The ASHC organization offering home infusion therapy typically delivers product to the patients home, manages the clinical administration of the therapy in consultation with the patient's physician and, in some cases, handles all insurance claim processing and reimbursement on behalf of the patient.

## Physical Therapy Centers

Physical therapy centers provide outpatient rehabilitation services for patients who have experienced muscular and/or skeletal injury. Working in consultation with physicians, licensed physical therapists construct therapy regimens specific to the patient's

condition. The increase in physical fitness awareness among the general public has also prompted an expansion of this service sector into preventive programs and consultations for amateur and professional athletes.

**Ambulatory Care Centers**

The ACC business provides products and services to patients who are capable of travelling to a central location to receive continuing—but relatively short duration—therapies such as chemotherapy for cancer patients and inhalation therapy for HIV/AIDS patients.

Like home infusion therapy, ACCs receive patients via referrals from doctors and hospitals, and also provide billing and reimbursement support for patients. Some ACC ventures also provide lab and radiology services, because some therapies are contingent on test results before an exact regimen can be

established.

**Home Monitoring**

Patient home monitoring is a relatively recent addition to the alternate site picture, providing remote computer-based monitoring of patients. The single most predominant application of this service currently is in the monitoring of pregnant women who are deemed high-risk by their physicians. A device connected via modem to a computer collects data and reports on fetal activity. A healthcare professional at a central location then interprets the results and advises the patient and physician with regard to the onset of labor, medication requirements and emergency situations.

**Business Activities Of The ASHC Environment**

Supporting the practice and administration of medicine in the ASHC environment

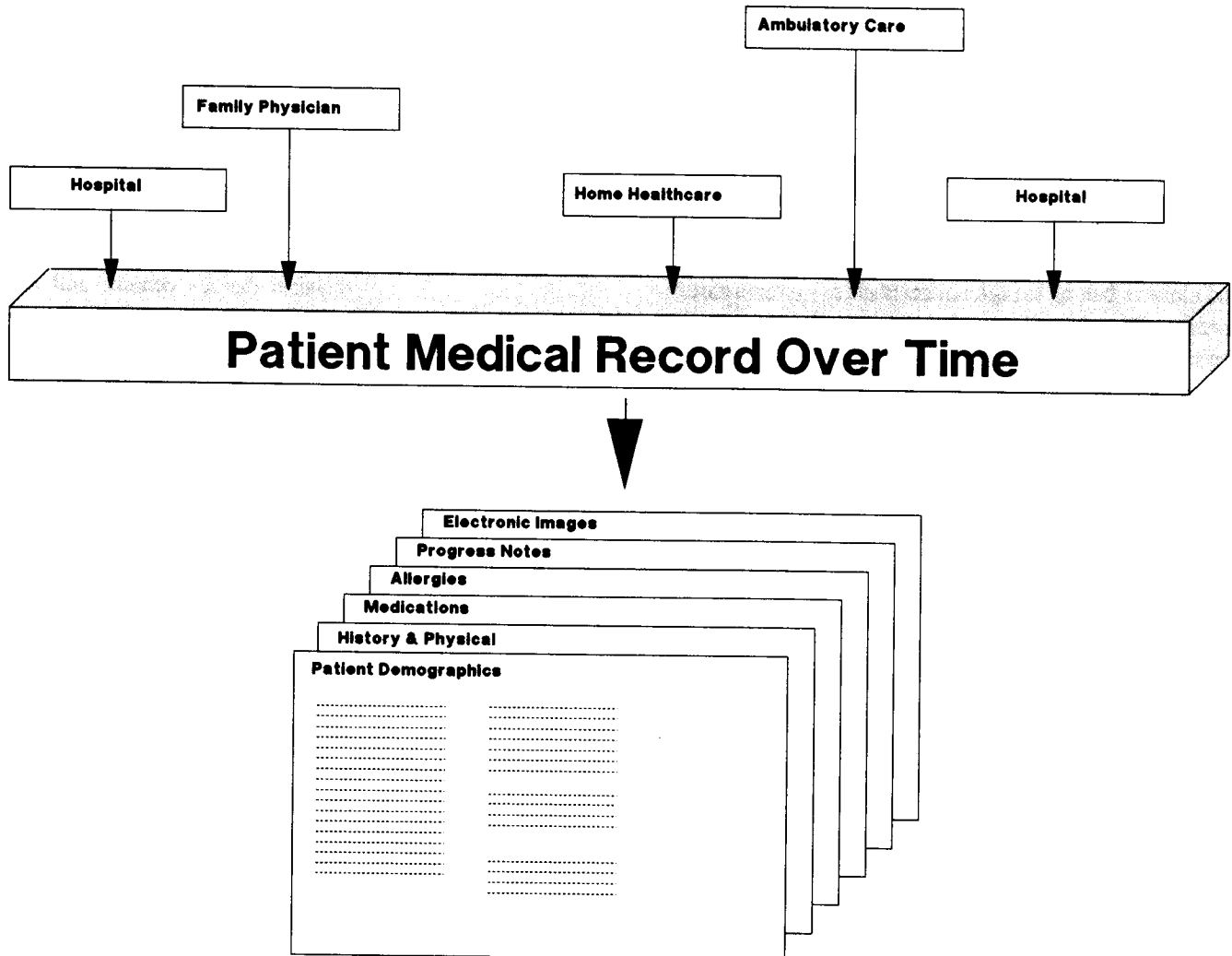
are many traditional business activities supported by information technology, such as the following:

- Order Processing
- Materials Management
- Billing/Claims Processing
- Financial Management

In addition, activities more directly related to patient care are increasingly taking advantage of information technology such as these:

- Patient Intake/Appointment Scheduling
- Medical Record/Chart Management
- Pharmacy Management
- Laboratory/Radiology Testing
- Nursing Services

It is these activities that typically require the application of new information technology and are therefore the most demanding in terms of development expertise, cost and



A PATIENT'S CONTINUUM OF CARE  
FIGURE 1

integration — both within and outside of the alternate site organization.

### Systems Approaches

Information technology support for the ASHC environment demands an approach that is flexible and evolutionary, due in part to rapid growth and expanding market opportunities. Key attributes of a successful IT strategy include decentralization, proprietary vs. commercial software and external integration.

#### Decentralization

There is an increasing tendency for ASHC enterprises to be multi-site corporations that compete locally. Given that, decentralized applications and hardware platforms offer distinct advantages, the most notable being that the technology is applied closest to

the point of use in each business.

This approach enables each site to operate within its local market independently of one another, thus permitting flexibility in operational hours, site-specific products and services, and customer requirements. Properly constructed and applied, a decentralized approach can offer the aforementioned benefits while still permitting corporate or home office functions visibility into the business as a whole.

#### Proprietary vs. Commercial Software

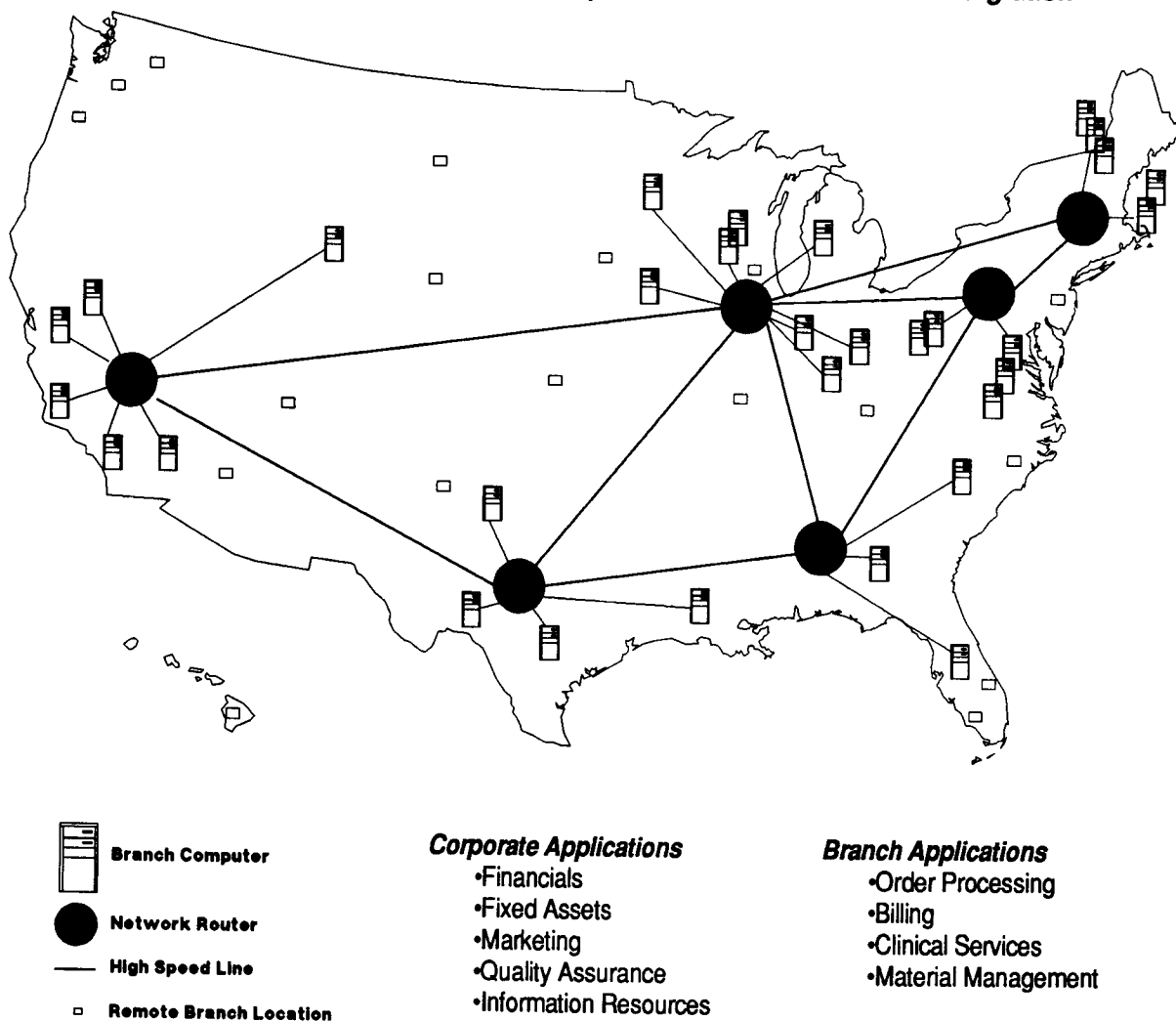
Application software "make vs. buy" decisions are becoming an increasingly important factor for the ASHC environment. Time-to-market for new ventures is critical, and proprietary software development can lag far behind the overall business. Commercial software, especially for the ambulatory care market, is readily available and can

serve as either an interim or long-term solution.

Proprietary software continues to play an important role, especially in the integration of diverse AHSC businesses and in support of opportunities to market information as a revenue generating product to the healthcare industry.

In order to minimize the risks of developing proprietary software for such a volatile industry, successful information systems groups will need to become well versed in modern development techniques such as joint application development, iterative prototyping and data-driven design. These techniques will assist in the timely determination of business requirements, the development of system models and the overall quality of the completed system.

#### External Integration



CAREMARK'S NETWORK  
 FIGURE 2

There is an increasingly strong demand for integrating ASHC ventures with other healthcare providers including hospitals, independent physicians and manufacturers, as well as with insurance companies and governmental bodies. A concept known as the "Continuum of Care" in which a patient is tracked throughout his life across all healthcare providers and encounters is gaining strong support and will require tight internal and external integration in order to be truly effective (see Figure 1).

For this and other integration opportunities, the lack of universal standards for information content and exchange, legal requirements for paper documents, and patient confidentiality issues must be overcome before

this level of sophistication becomes the norm. It is important that systems being designed and implemented at present be flexible enough to be incorporated into such an approach in the near future.

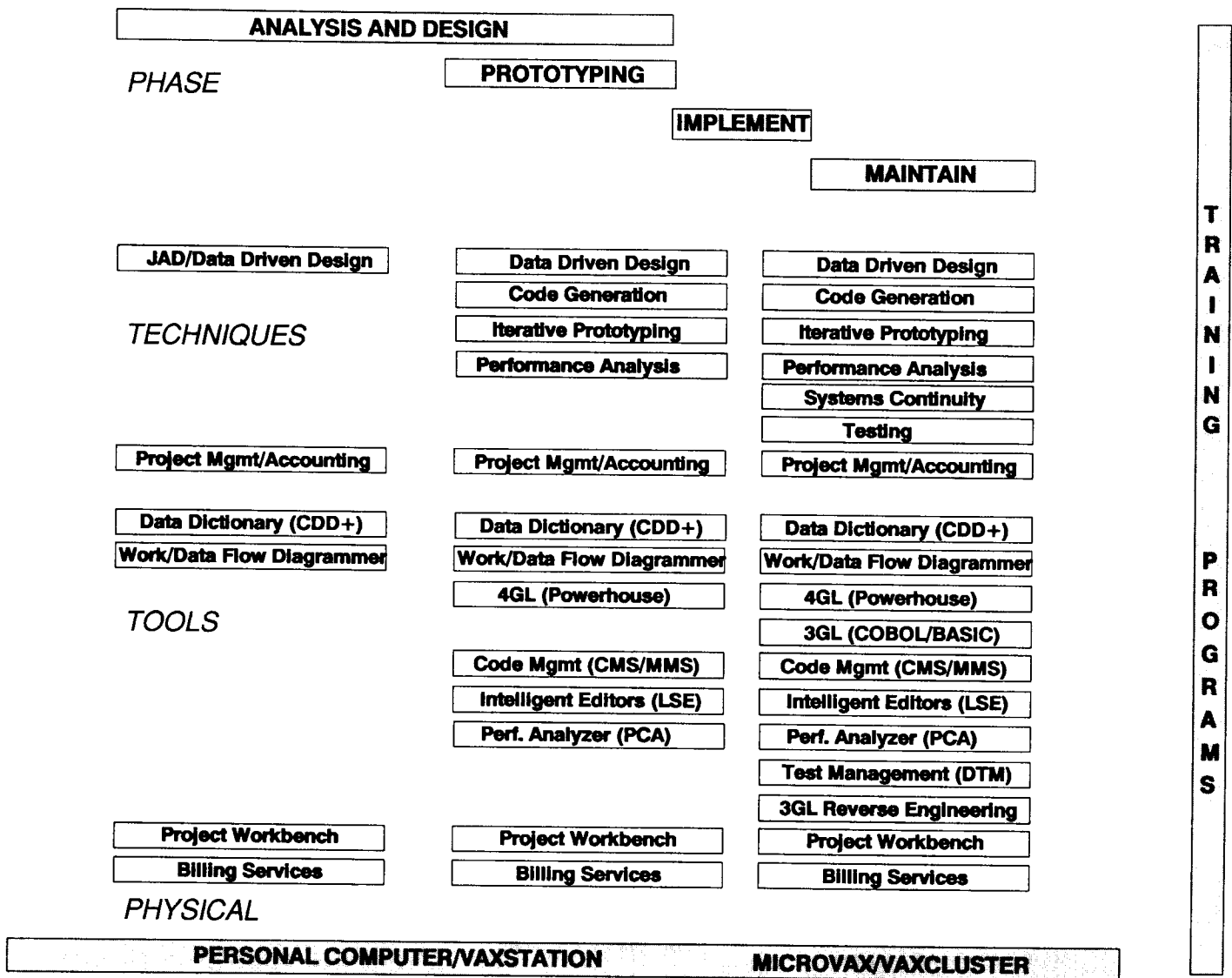
### An ASHC Model

Caremark Inc. is a provider of alternate site healthcare services. A division of \$9 billion Baxter Healthcare, Caremark offers home infusion therapy, ambulatory care center chemotherapy, home monitoring and clinic-based HIV/AIDS therapies. Caremark has experienced rapid growth in both total patient volume and product lines, and is continually evolving and responding to

changes and opportunities within the ASHC environment.

The Caremark business model stresses the importance of high-quality, low-cost alternate site care nationwide, coupled with high local visibility in the healthcare community. Supporting this model are more than 100 Caremark branches across the United States and Canada. The nationwide aspect of Caremark fosters an internal network of healthcare providers that can exchange clinical information, share operational improvement ideas and combine product requirements for vendor quantity discounts.

Information technology support of this business model is implemented with a hybrid strategy of decentralized and centralized ap-



CAREMARK'S INFORMATION RESOURCES METHODOLOGY OVERVIEW  
FIGURE 3

plications and hardware platforms. Clinical, operational and revenue systems are placed at branch locations, while financial, marketing, quality assurance and human resource systems are positioned at headquarters to support the centralized nature of these functions. All locations are connected via a wide-area network and operate in peer-to-peer or standalone mode depending on the application (see Figure 2).

The daily operation of each location is supported by an on-site systems operator who is responsible for ensuring basic systems availability, performing housekeeping and running regularly scheduled jobs. This operator is backed up by the corporate information resources group, which includes a 24-hour-a-day technical assistance center and application and technical specialists.

Communication with each branch location is provided via traditional phone technology, interoffice mail and fax, and a network-wide electronic mail system. Implementation of the latter technology has resulted in the ability to quickly disseminate corporate-wide information to all locations while also permitting efficient interbranch communication.

Caremark's information resources group is developing systems utilizing technology based upon set of information technology principles as set forth in the organization's strategic systems plan:

**•Architecture**

*A. Create a flexible/expandable architecture in order to quickly accommodate and integrate new and changed business requirements.*

*B. Create an architecture that capitalizes on Caremark's national scope and develops competitive use of information.*

*C. Re-engineer business processes to improve cost structure and reduce inefficiency.*

**•Integration**

*A. Develop systems that are both horizontally and vertically integrated.*

*B. Place system responsibility as close to the user as possible.*

*C. Minimize redundant or duplicate data and processing.*

*D. Develop a standard system solution for each business.*

In addition to these general principles of

system development, Caremark information resources is also employing a modern system development methodology in order to increase the overall quality of systems and decrease overall development time.

This methodology stresses joint application development, data-driven design and iterative prototyping techniques, along with 4GL programming languages and modular/reusable code. The methodology has been designed to be technology-independent in order to take advantage of future technology without discarding fundamental techniques (see Figure 3).

**Future Directions**

The next decade will continue to experience a rapid growth in ASHC. Key information technologies and opportunities for support of this growth will occur in the following areas.

**Electronic Data Interchange**

Applications such as insurance claim processing and the integration of patient histories across multiple healthcare providers will need standardized protocols for the formatting, transmission and content of patient and provider data.

**Voice/Image/Text Integration**

An electronic medical record offers a means to capture, store and retrieve the vast quantities of data associated with patient care. Text, spoken word and images such as X-ray and MRI will be integrated into a common database of patient care information that is accessible by all parties authorized to care for or act on behalf of the patients.

**Remote Patient Monitoring**

Remote patient monitoring technology will continue to expand. RPM offers opportunities to provide routine diagnostic and patient at-home recovery services in addition to the high-risk services currently offered.

**Information Services**

As the total patient population serviced by ASHC increases, the products and services consumed in patient care will also increase. This will present opportunities for ASHC firms to market data to manufacturers and distributors for use in market surveys and clinical trials. Demographic databases and query tools that can quickly sift through large

*(continued on page 41)*



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scheduled for training in a way that would give all staff the time they needed for training but, at the same time, not compromise patient care. Again, marketing was key to creating enthusiasm about learning a new system when users were just getting accustomed to the old. The hard work of the team paid off once again with another success that would be judged by the speed in which users adapted and became comfortable.

Care plans and workload measurement systems are the only remaining areas of nursing practice that have not yet been automated, because there were no manual care plans in place and the manual workload measurement systems were not yet stabilized. In preparation for automation, manual care plans are being developed by the clinical nurses on each unit. It was considered essential that those care plans be developed by nurses for nurses and be infinitely practical and usable, supporting them in their day-to-day patient care. Their design should not be driven by computer systems requirements, but rather by the manual care plans within limited format guidelines. The computerized care plan system will be implemented this year.

In addition to implementation, there is ongoing system maintenance involving collaboration and cooperation on problem solving from all the departments with whom nursing interacts. Nursing cannot operate in isolation. Good interdepartmental communications and cooperation are critical to preventing small problems from becoming insurmountable issues. The nursing key user has become the link between the departments and nursing and between nursing and management information systems. The nursing application consultant provides the link between the system vendor and the users, and acts as a troubleshooter and technical advisor with a broader view of the global hospital picture. This ensures that any changes or problems with one application that may impact another application can be anticipated or avoided.

Clinical nursing data is only a small portion of the data available to nurses at all levels. To get the complete picture, nurses must get information from other applications such as lab, radiology, pharmacy and finance. In these days of limited funding and

tight budgets, nurses and nurse managers need all the data they can get to support their needs for staffing and funding, and to predict patient population trends and needs.

With the expanding capabilities of computerized systems, the complete electronic chart is not so far away. Nurses should be giving extra thought to issues such as confidentiality and the security of patient information. Wantonly giving your password to other people or allowing them to use the system after you have typed in your password could have drastic legal consequences because the password is your electronic signature. This is something not to be taken lightly.

Full electronic charting should eliminate the duplication that now takes place in the manual system and should be designed in a way that maximizes the data input while minimizing actual keyboarding.

### Nursing Realities

There are certain realities that nurses would like to change but will probably have to accept.

**REALITY 1** — Computers are everywhere — at work, at home and at leisure. Having typing skills really will make life a lot easier.

**REALITY 2** — Computerization does not reduce the amount of paper, YET.

**REALITY 3** — People make mistakes. The information in the computer is only as reliable as the person who typed it in.

**REALITY 4** — There may be a number of things that nurses would like to change about nursing systems, and they may wonder why the powers that be selected the system in the first place. The reality is that all departments feel the same. No vendor can supply a system that is perfect for each application. Certain criteria are identified as essential and certain others are "nice to haves." When selecting integrated systems, decision makers select the best system that can supply all the essentials and as many of the "nice to haves" as possible. Some applications may be stronger than others. In order to get changes made to the system purchased, one of the selection criteria is the company's willingness to give reasonable consideration to incorporating some of the hospital's needs into future enhancements.

**REALITY 5** — Computers do not replace nurses. All the human innate skills, instincts and intuition are still required to care for patients. Computers cannot read the pain in a patient's expression or determine the underlying meaning to a patient's words.

From the system selection process to the implementation and maintenance of the nursing applications, nurses at all levels in Markham Stouffville Hospital have been given the opportunity to be involved and make decisions and recommendations. From the president to the vice president, from the application consultants to the director of nursing, and from the educator to the nursing managers and clinical nurses — all were nurses and all were involved. It is truly a system for nurses and by nurses. It is the only way to empower nurses, to give them a voice in their futures and, as Markham Stouffville Hospital's nursing philosophy reflects, to "...promote excellence in patient care, enhance the satisfaction of the practitioner and ultimately contribute to the advancement of the profession of nursing." [JSM]

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### Alternate Site (continued from page 17)

amounts of data will be required to support these endeavors. [JSM]

### Conclusion

The burgeoning ASHC market must continue to effectively apply information technology in order to reduce cost and increase the quality of patient care and service. An effective IT strategy will be focused on placing systems as close as possible to the end user, and designing these systems so that they are tightly integrated within and outside of the organization, but remain flexible and adaptable to the evolving role of this segment of the healthcare industry.

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