Information Systems & Technology

Debra Kirkley
A. Patricia Johnson
Mary Ann Anderson

Technology Support of Nursing Excellence: The Magnet Connection

Executive Summary

▷ Magnet hospitals have low turnover and some even have waiting lists of nurses wanting to join their ranks. Studies illustrate that these institutions are safer workplaces as well, with fewer accidents such as needlestick injuries.

▷ At the bedside, information technology can help improve nursing productivity and enhance collaboration and communication between caregivers.

▷ Organizationally, the leadership strategies, interdisciplinary committees, and workflow design processes required for successful technology implementation also correspond with the leadership and cultural initiatives espoused by the Magnet program.

NURSES ARE THE HUB of the health care organization. As the coordinators of care — and as the clinicians who spend the most time at the patient's bedside — it is difficult to overstate their importance to the delivery of quality care.

As many organizations struggling to recruit and retain capable nurses have realized, nursing retention also strongly affects the bottom line. Joint Commission on Accreditation of Healthcare Organizations, in its white paper, "Healthcare at the Crossroads," estimates that turnover of a medical-surgical nurse in U.S. hospitals costs an average of $46,000 (JCAHO, 2001).

A select group of hospitals have found proven solutions to address nursing recruitment and retention and to foster nursing leadership. Recognized as Magnet hospitals by the American Nurses Credentialing Center, a subsidiary of the American Nurses Association, these institutions consistently attract and successfully retain nurses. Magnet hospitals have low turnover (Janzen, 2003; McClure &

DEBRA KIRKLEY, PhD, RN, is Director, Nursing Informatics, IDX Systems, Seattle, WA.

A. PATRICIA JOHNSON, MAEd, MA, RN, is Vice President, Operations, and Chief Nursing Officer, Wake Forest University Baptist Medical Center, Winston-Salem, NC.

MARY ANN ANDERSON, MSN, RN, is Director of Nursing, Clinical Systems, Wake Forest University Baptist Medical Center, Winston-Salem, NC.

Hinshaw, 2002) and some even have waiting lists of nurses wanting to join their ranks (Gordon, 2002). Studies illustrate that these institutions are safer workplaces as well, with fewer accidents such as needlestick injuries (Aiken, Sloane, Lake, Sochalski, & Weber, 1999).

While such findings alone are enough to make CEOs and CNOs sit up and take notice, there are even more important advantages associated with Magnet status. Research shows that Magnet hospitals also have better patient outcomes (Aiken, Havens, & Sloane, 2000), shorter lengths of stay (Aiken et al., 1999), higher patient satisfaction, and lower Medicare patient mortality rates (Aiken, Smith, & Lake, 1994).

Magnet program criteria are based on the American Nurses Association (ANA) *Scope and Standards for Nurse Administrators* (ANA, 1996). For hospitals to earn Magnet recognition, they must demonstrate excellence in nursing leadership, organization and management structure, evidence of professional practice and nurse autonomy, quality of interdisciplinary relationships, and other metrics. Today, only 101 of the nation's 5,794 registered hospitals (Health Forum, 2002) have received Magnet recognition.

The Magnet program originated with a landmark 1983 study (McClure, Poulin, Sovie, & Wandelt, 1983), conducted by the American Academy of Nursing. This study identified characteristics common to hospitals with environments of nurse retention. Today, these characteristics are referred to as the "Forces of Magnetism" (American Nurses Credentialing Center [ANCC], 2003).

Since the Magnet program originated, another significant development has shaped nursing practice in leading U.S. hospitals — the growth of clinical information technology (IT) in support of nursing excellence. The Magnet program metrics do not specifically reference clinical IT and many hospitals have achieved Magnet recognition without it. However, there are strong parallels between the characteristics that distinguish Magnet-level performance and the successful deployment of clinical IT to support nursing practice.

At the bedside, IT can help improve nursing productivity and enhance collaboration and communication among caregivers. Organizationally, the leader-

ship strategies, interdisciplinary committees, and workflow design processes required for successful technology implementation also coorespond with the leadership and cultural initiatives espoused by the Magnet program.

In this article, we use the Magnet "Forces" as a framework to demonstrate how organizations can leverage clinical IT to support nursing excellence, and focus on successful nursing and IT practices employed by North Carolina Baptist Hospital of Wake Forest University Baptist Medical Center, a Magnet hospital since April 1999.

The medical center, an integrated health care system in Winston-Salem, NC, is notable for its use of technology to support nursing excellence — both at the bedside and the more overarching organization level. The medical center is committed to promoting a professional practice environment, shared governance among nurses, and recognition programs among other initiatives that support the nursing excellence synonymous with the Magnet program. In 1998, the medical center began installing the IDX *LastWord*® enterprise clinical system, and has since used the system for key initiatives including online decision support, clinical documentation, care planning, and computerized provider order entry (CPOE). In deploying the clinical information system (CIS) and other innovative uses of technology, the medical center has fostered nursing practices that mesh with the Magnet "Forces."

Quality of Nursing Leadership

Knowledgeable, strong risk-taking nurse leaders who follow an articulated philosophy in the day-to-day operations of the nursing department. Nursing leaders convey a strong sense of advocacy and support on behalf of the staff (ANCC, 2003).

In today's volatile health care system, developing a proactive, supportive care environment that satisfies nurses and ensures patient safety requires outstanding leadership. It takes a strong nurse leader to spearhead continuous quality improvement initiatives, strategically manage resources, ensure collaboration, foster lifelong learning, and facilitate empowering care delivery models that raise the level of nursing practice within the organization. Nurse leaders striving for every opportunity to support nursing excellence can exploit information technology to identify issues, analyze outcomes, and access hard data to support programs for change. At the medical center, nurse leaders regularly review and use data drawn from the decision support system, including information on staffing, patient accounting, and patient satisfaction. Nurse leaders use these data to recognize successes, identify areas for improvement, and help plan nursing programs at the strategic level.

Perhaps the most provocative connection between leadership and IT is that it takes an innovative, risk-taking, dynamic nurse leader — the type found at Magnet institutions — to undertake the large-scale organizational change needed to successfully implement a clinical information system. At every step of the process, it is critical to gain input and buy-in from the people who will use the CIS — and nurses are especially important, given their central role to patient care.

Nurses are responsible for the online clinical documentation that serves as a foundation for many other clinicians' interaction with the CIS. By facilitating a successful transition to online clinical documentation, a CNO will go a long way toward ensuring the success of other safety initiatives, including CPOE and bar-code medication administration.

Organizational Structure

Organizational structures are generally flat, rather than tall, and unit-based decision making prevails. Strong nursing representation is evident in the organizational committee structure. Executive level nursing leaders serve at the executive level of the organization. The Chief Nursing Officer often reports directly to the Chief Executive Officer (ANCC, 2003).

The flat, collaborative organizational structure found in Magnet hospitals is consistent with that of the organizational collaboration necessary to successfully select, design, and implement an enterprise-wide CIS. During the adoption of *LastWord*, the medical center created interdisciplinary teams of clinicians and other staff members to define and redesign workflow, design and build screens, and develop training programs for nurses to learn the system.

Real-time access to information empowers nurses at all levels of the organization. At any time and from any terminal, staff and managers can access census data, throughput analysis, and procedural delays that allow them to problem solve at the unit level. Unit-based charge nurses can monitor daily care delivery and proactively intervene when data suggest intervention is warranted.

Management Style

Hospital and nursing administrators use a participative management style, incorporating feedback from staff at all levels of the organization. Feedback is encouraged and valued. Nurses serving in leadership positions are visible, accessible, and committed to communicating effectively with staff (ANCC, 2003).

To best support the effective implementation of a CIS, an organization greatly benefits from an effective change management program, incorporating input from nurses and other clinicians at all levels in the organization. During its *LastWord* implementation, the medical center recruited a team of nurse managers to serve as a direct conduit from clinicians to the information services (IS) staff members charged with building the system, and then worked directly with

nurses to teach them to use the system.

At the outset of the project, the organization created a Nursing Clinical Information Systems (NCIS) team that began with the director of nursing information systems and grew to include the nursing information systems manager, five nursing information systems specialists, and five nursing information systems trainers. All NCIS members were registered nurses.

The NCIS team elicited feedback and input and managed front-line contact with the clinical staff throughout the system design, training, implementation, and IT support processes. During the project, NCIS members met weekly with the organization's IS analysts to communicate clinicians' comments on everything from workflow issues to screen changes to nurse reporting needs.

Over the course of 8 years, the NCIS has trained 3,074 staff nurses on core nursing functionality, including online results reporting and clinical documentation, medication charting, patient assessments, and other applications, as well as trained multiple physicians and other clinicians. The NCIS members' success at training staff nurses — those who most often serve as the first contact to answer questions as physicians and other clinicians become familiar with the system — was critical to the overall acceptance of the system.

Personnel Policies and Programs

Salaries and benefits are competitive. Creative flexible staffing models are used. Personnel policies are created with staff involvement. There are significant opportunities for growth in administrative and clinical areas (ANCC, 2003).

Information systems support more than clinical care delivery. They serve administrative needs as well, including scheduling and financial activities. For example, nurse managers can use a system's reporting capabilities to analyze patient needs and nursing activities to support data-driven staffing models.

Professional Models of Care

Models of care that give nurses the responsibility and authority for the provision of direct patient care. Nurses are accountable for their own practice as well as the coordination of care (ANCC, 2003).

In addition to providing nurses with secure and appropriate access to patients' comprehensive medical records, clinical IT systems place care models, protocols, and decision-support tools electronically at the point of care — giving nurses the tools they need to make informed decisions.

Decision-support systems crosscheck orders, assessments, and other patient information against rules and alerts developed to support specific health care processes. For example, decision support can provide real-time best practice advice triggered by specific patient findings, such as a suggestion to institute a skin-care protocol when a nurse records assessment data correlating with high risk for skin breakdown. To support patient safety, the system can check for drug-drug (drug-allergy) interactions or duplicate orders and notify the nurse with an on-screen alert to allow for timely intervention.

Quality of Care

Providing quality care is an organizational priority. Nurses serving in leadership positions are seen as responsible for developing the environment in which high-quality care can be provided. There is a perception among nurses that they provide high-quality care to the patient/resident/client (ANCC, 2003).

The medical center has instituted a screening program performed by nurses during their initial assessment, which is incorporated into the clinical system, to identify patients at risk for aspiration pneumonia. If the nurse diagnoses a problem, he or she has the authority to take action based on a designated care plan. The program has been highly successful. One medical unit has seen a 75% decrease in the number of patients with aspiration pneumonia as a result of nurses screening for dysphagia and other predictive signs.

Because *LastWord* allows nurse leaders to extract data about these patient outcomes, they can readily communicate successes to, and congratulate, the nursing staff. This helps reinforce to nurses the real impact they make on patients' lives, providing heightened job satisfaction.

At the organizational level, nurse leaders use the data to report the new screening program as a clear "win" — in terms of increased patient safety and reduced costs associated with shorter patient stays. This early win, enabled by the ability to track outcomes, will help open doors for many innovative nursing programs in the future.

Quality Improvement

A process that improves the quality of care delivered within the organization (ANCC, 2003).

A CIS, with its ability to increase communication, enable access to information, and standardize care, provides high-level support for quality initiatives. An organizational change as large as the implementation of a CIS causes significant organizational disequilibrium. Nurse leaders can use this disruption to their advantage, seizing the opportunity for assessment, improvement, and change.

Wake Forest University Baptist Medical Center has achieved significant quality improvement outcomes with its CPOE system, which is live on five nursing units. Preliminary data gathered by documenting adverse drug events (ADEs) by chart review prior to and after implementation on two cardiology

units shows a significant decrease in ADEs as a result of adopting CPOE. From the first and second quarters of 2002 to the same time period in 2003, the number of ADEs dropped 35% on the first unit to go live and 39% on the second unit.

Commitment to gain frontline support and participation from nursing staff is a major factor in success with CPOE. Prior to implementation, the organization invested a significant amount of resources to ensure its nurses were experienced with electronic clinical documentation and other systems. Nursing documentation was seen as a critical first step to populate the electronic patient record with up-to-date information to support physician decision making.

Not only were nurses the early adopters of the system, but they also participated in an interdisciplinary team with pharmacists, physicians, IS analysts, and others to lead the CPOE implementation. Throughout the process, systems trainers from the NCIS provided training and 24/7 on-site support; today, 207 physicians are trained on the system.

Consultation and Resources

There is an availability of knowledgeable experts, particularly advanced practice nurses, for peer support and consultation within and outside the nursing division (ANCC, 2003).

At Wake Forest University Baptist Medical Center, clinical specialists play a significant role in quality patient care. Because they are such valuable resources, the organization enlisted its clinical specialists to help tailor the order entry systems, which although used almost exclusively by physicians, naturally cross all disciplines and specialties throughout the hospital.

The clinical specialists were critical to the process, assembling and facilitating teams of clinicians charged with developing order sets. They also helped guide design based on their knowledge of nursing best practices and evidence-based care; in effect leaving a lasting impression of their recommendations available electronically to nurses and other clinicians anywhere, anytime.

The medical center's decision-support capabilities make advanced clinical knowledge available to staff nurses and other members of the care team, even if the experts are not there in person.

Autonomy

The nurse is permitted and expected to practice autonomously, consistent with professional standards, and independent judgment is expected to be exercised within the context of a multidisciplinary approach to patient/resident/client care (ANCC, 2003).

With built-in decision support and care protocols available at the point of care, a CIS supports nurse autonomy. During the CIS system implementation, nurses and physicians at the medical center collaborated on care protocols for autonomous nursing intervention for patients experiencing potentially life-threatening situations.

The protocols also support nursing action in non-emergent situations. In compliance with core health practices for pneumovax vaccine administration, the medical center incorporated a screening for patient susceptibility to pneumonia in its admission assessment. Protocols support nurse decision making in administering the vaccine when identifying patients at risk.

Community and the Hospital

Community presence is often established through ongoing, long-term outreach programs resulting in the hospital being perceived as a strong, positive, and productive corporate citizen. (Hospitals with strong community presence are able to recruit and retain nurses.) (ANCC, 2003)

In conjunction with a comprehensive outreach program, a community Web portal can help strengthen an organization's community relations by providing a new line of communication and positioning the hospital as a trusted local resource for health information.

The medical center is distinguished by its comprehensive patient information Web site, which includes an online health encyclopedia, body guide, online medication guide, and other valuable resources to consumers.

Health care organizations are also expanding use of Web-based portals that communicate directly with the clinical information system. This approach enables patients to safely view their own health information online, communicate electronically with their clinicians, review test results, and request appointments from the comfort of home.

Nurses as Teachers

Nurses are permitted and expected to incorporate teaching in all aspects of their practice (ANCC, 2003).

Patient teaching is a significant component of nursing practice and a key source of satisfaction for practicing nurses. Traditional paper-based systems require storage of patient education materials throughout the building. Hunting down and copying needed material eats into the productive time a nurse could be spending providing patient teaching and answering patient questions.

Storing these materials online frees up needed space on the nursing unit, makes teaching materials immediately accessible, and permits nurses to customize views to best support patients' individual learning needs. Text, graphs, tables, and more can be used to display information to help patients understand their illness and their treatment plan.

At Wake Forest University Baptist Medical

Center, nurses provide patient-specific instructions for diagnoses, medications, treatments, recommended diets and followup, helping to increase patients' knowledge of their illness, medications, and recovery.

Image of Nursing

Services provided by nurses are characterized as essential by other members of the health care team. Nurses are viewed as an integral part of the hospital's ability to provide patient/resident/client care.

By supporting enhanced communication among clinicians, clinical IT systems can educate the entire organization about the complex and important role that nurses play. With paper-based processes, clinicians at the medical center — like many other organizations in the industry — had to share each patient's paper chart. Nurses' findings are now documented in the electronic medical record (EMR) and are available real-time to everyone on the care team. The findings are much easier to access by multiple users, and available for physicians, pharmacists, and other clinicians to view and utilize information formerly perceived as nurse-specific. Finally, making nursing documentation more widely available has increased visibility for a profession whose contributions have been historically invisible. At the medical center, other clinicians understand and respect what nurses bring to the bedside.

In addition, internal communications about successful outcomes such as results of the screening program have earned the nursing staff greater respect from physicians and other clinicians, reinforcing the concept that nurses are key to high-quality care at the organization.

Interdisciplinary Relationships

A sense of mutual respect among all disciplines resulting in positive interdisciplinary relationships (ANCC, 2003).

Clinical information systems foster communication and collaboration by capturing data in a single electronic medical record. Unlike the paper chart, divided into discipline-specific sections, an EMR allows all members of the care team to see (and take action on) exactly the same information. This opens lines of communication, allowing clinicians to work more collaboratively.

In addition, the process of implementing *LastWord* at the medical center also helped to cultivate professional relationships and understanding between groups of clinicians. Working on interdisciplinary teams to build the electronic record gave clinicians the opportunity to study the roles that other disciplines play at the organization. With strong support from IS staff, nurses collaborated closely with members of the pharmacy team to design physician order systems that met both groups' needs for accessing information, and in the process, developed mutual respect for what others bring to the care continuum.

Professional Development

Value is placed on personal and professional growth and development. Emphasis is placed on orientation, inservice education, continuing education, formal education and career development. There are opportunities for competency-based clinical advancement along with resources to maintain competency.

At Wake Forest University Baptist Medical Center, nurses carry most of the responsibility for their individual development and professional growth. To support their personal initiatives, all educational materials, policies, and procedures have been consolidated online, making these available to nurses 24/7. Nurses now conduct their competency training via computer when it is convenient for them.

Conclusion

An institution's success at creating an environment that supports nursing excellence is built on myriad leadership, cultural, and organizational factors. Wake Forest University Baptist Medical Center has exploited clinical IT as part of a comprehensive plan to help support many of its goals for nursing excellence and outstanding patient care.$

REFERENCES
Aiken, L.H., Sloane, D.M., Lake, E.T., Sochalski, J., & Weber, A.L., (1999). Organization and outcomes of inpatient AIDS care. *Medical Care, 37*(8), 760-772.
Aiken, L.H., Havens, D.S., & Sloane, D.M. (2000). The magnet nursing services recognition program: A comparison of two groups of magnet hospitals. *American Journal of Nursing, 100*(3), 26-36.
Aiken, L.H., Sloane, D.M., Lake, E.T., Sochalski, J., & Weber, A.L. (1999). Organization and outcomes of inpatient AIDS care. *Medical Care, 37*(8), 760-772.
Aiken, L.H., Smith, H.L., & Lake, E.T. (1994). Lower Medicare mortality among a set of hospitals known for good nursing care. *Medical Care, 32*(8), 771-787.
American Nurses Association. (1996). *Scope and standards for nurse administrators.* Washington, DC: Author.
American Nurses Credentialing Center. (2003). *Health care organization instructions and application process manual.* Washington, DC: Author.
Gordon, H.B. (2002). Success story: No nursing shortage here. *Continuous Improvement* [online journal]. Retrieved from: www.ihi.org/resources/continuousimprovement/ index.asp
Health Forum. (2002). *Hospital statistics.* Chicago: American Hospital Association.
Janzen, S.K. (2003). Testimony before the House of Representatives Committee on Veterans' Affairs, Subcommittee on Oversight and Investigation.
Joint Commission on Accreditation of Healthcare Organizations. (2001). Health care at the crossroads: Strategies for addressing the evolving nursing crisis (white paper). Oakbrook Terrace, IL: Author.
McClure, M.L., & Hinshaw, A.S. (2002). *Magnet hospitals revisited: Attraction and retention of professional nurses.* Washington, DC: American Nurses Publishing.
McClure, M.L., Poulin, M.A., Sovie, M.D., & Wandelt, M.A. (1983). *Magnet hospitals: Attraction and retention of professional nurses.* Kansas City, MO: American Academy of Nursing.