E-Health Web Portals

Delivering Holistic Healthcare and Making Home the Point of Care

■ *Linda E. Moody, PhD, MPH, BC, FAAN*

E-health delivers healthcare services and education, via a Web portal, to older persons with chronic conditions and their caregivers and enables the patient's home to be the point of care. This growing industry is ripe for exploration by nurses who can empower the patient and caregiver to gain self-care and coping skills. Advances in information technology now make this dream a reality. **KEY WORDS:** *e-health, nurse informatics, point of care, telehealth, telemedicine* Holist Nurs Pract 2005;19(4):156–160

Recognized in 1992 by the American Nurses Association, nursing informatics is a relatively new nursing specialty that has expanded rapidly, applying new health information technologies (HIT) to better serve patients and improve safety and quality.[1] Although it may seem strange to promote HIT in a journal embracing holism as the underlying philosophy of patient care, principles of holism are easily embedded in the design of e-health programs.

Nursing informatics has been diffused into all dimensions of nursing, from advanced nurse practitioner (NP) practice, home health, critical care, and emergency departments (EDs) to the use of evidence-based support and decision making for nurses on clinical units. Nowhere is management and processing of health-related information more important to ensure quality and patient safety than in healthcare agencies.[2] Dr David Brailer, responsible for building electronic health records (EHR) for the National Health Information Infrastructure (NHII), has received widespread endorsement, including the National Alliance for Health Information Technology, the eHealth initiative, and provider organizations and HIT vendors. Dr Brailer emphasizes the importance of nationally adopting HIT:

Health IT can enable transformation of healthcare by allowing a better way to care—consumer-by-

consumer, physician-by-physician, disease-by-disease, and region-by-region. Health IT has shown a challenged, but resilient, industry that there is hope for change, and that hope doesn't have to come from the top down but from the inside out. Health IT is not about better treatments for the ailing and ill among us or just for all of us who want to prevent or limit illness in its early stages. It is, ultimately, about treating the industry itself, so that we not only have the best science, infrastructure, and professionals in the world, but also the best value, safety, and productivity.[3]

Digital environments in healthcare are catching up with information technology (IT) applications in business and education. With IT applications, decision-support systems can facilitate split-second decision making, wireless communications, monitoring systems run with computerized backbones, and computerized ordering and documentation; applications that were unimaginable a decade ago are becoming fundamental to nursing and healthcare practice. Although nurse informaticists work with computers and other technologies, technology is not the essence of nursing informatics. HITs are simply tools that can be adapted and applied electronically (automatically); hence, the term *informatics*, to automate the process of nursing and healthcare data collection or reporting at any phase of the patient care process (assessment; evaluation of data within the context of care [decision-support]; application of information for interventions, such as evidence-based care; or development of decision-support systems and best practice models).[4]

Informatics tools include handheld devices, such as bar code scanners for medications or identification,

From the College of Nursing, University of South Florida, Tampa.

Corresponding author: Linda E. Moody, PhD, MPH, BC, FAAN, College of Nursing, MDC 22, University of South Florida, Tampa, FL 33612 (e-mail: lmoody@hsc.usf.edu).

FIGURE 1. Mobile applications in healthcare.

personal digital assistants (PDAs), or tablet personal computers (PCs) that enable electronic data collection or reporting at point of care: hospital bedside, outpatient clinic, or patient's home (Fig 1). Despite the digital divide slowly narrowing in the older population, the use of e-health applications by nurses has enormous potential to enable elderly persons with chronic conditions to improve self-management skills,[5,6] symptom and intervention management, and quality of life when point of care becomes the patient's home.[7] As vendors develop mobile and user-friendly applications and Internet providers make services more affordable, the potential to apply e-health care, from Web-based health information to full primary care services in the patient's home, becomes less a fantasy and more a reality.

By defining the scope of the relationship between nurses and IT, nursing will play an essential role in the future direction of healthcare and, from that participation, evidence-based knowledge will be gained when these domains work together.

TERMINOLOGY

E-health

A young, expanding field, e-health is an outgrowth of telehealth or telemedicine. The e-health subspecialty aims at the consumer or caregiver, applying a holistic view in which illness, especially chronic conditions,

affects the whole family. It differs from telehealth or telemedicine in that e-health is Internet-based and includes a range of services, nursing or healthcare, health education, and medication prescription or refills via e-prescribing.[8] In conjunction, telemonitoring devices may be used, via a Universal Serial Bus (USB) port on the patient's computer, to collect additional physiologic data (eg, blood pressure, pulse, temperature, weight, spirometry, blood glucose, and oxygen saturation level). Evidence-based guidelines can be built into some systems to ensure the provider is following discipline standards. In a pilot study by this author, the gold standard developed for chronic obstructive pulmonary disease (COPD) (American Lung Association) was used as the best practice guideline.[7]

Telehealth

Telehealth, considered the use of home-monitoring systems by nurses, may be designed to provide home healthcare nursing services to monitor chronic diseases, such as diabetes. A video monitoring system may be used in conjunction with the monitoring device at both ends of the system, permitting video and voice interaction between nurse and patient and adding a personal touch.

Telemedicine

Telemedicine usually refers to the remote monitoring of health data (eg, monitoring electrocardiographic [ECG] data in patients with congestive heart failure) from the patient at home to the healthcare agency provider, usually a physician or NP. There may or may not be interaction between patient and provider; for example, when ECG data are abnormal, the patient may be called by the physician, who then initiates further treatment.

Web portal

A Web portal is a secure intranet system specifically designed and customized for the special needs of a designated group of people or patients. To meet the Health Insurance Portability and Accountability Act (HIPAA) requirements, a Web portal requires a secure socket layer (SSL) for security and a unique identification (ID) and password for all users and providers.[9] A subscription fee may be required.

THE DRIVING FORCE

The case for adopting e-health (with or without telemonitoring) in the home setting is more compelling than ever. One important driving force behind the movement toward the digital healthcare age is the dramatic increase in our elderly population, who provide an endless consumer base. In addition, electronic technology is now more functional and affordable and there is a national mandate to control healthcare costs, influencing even the most skeptical healthcare decision makers to accept new modes of care delivery.[10] Finally, add the most severe nursing shortage to date, and the formula is complete. In the next decade, the greatest demand for e-health services will come from Internet-savvy baby boomers who expect to have online access to services, including banking, shopping, and healthcare.

BARRIERS TO E-HEALTH

Three major obstacles exist to the adoption of e-health in some areas of the United States: (1) Although reimbursement for e-health, telecare, and telehealth visits varies by state, there is more activity now at the federal level to work toward a national reimbursement process for all states and levels of reimbursement for varied types of e-visits, depending on the level of the provider. (2) Digital e-prescription signatures also vary by state; currently, only 23 states permit e-prescribing. Elderly persons can request convenient home delivery once their local pharmacy receives the e-prescription from their healthcare provider. Electronic signatures are acceptable to the Joint Commission on Accreditation of Healthcare Organizations; however, there is no national standard.[11] (3) Privacy and security must be respected and providers must comply with HIPAA. Enacted in 1996,[12] the Act has been revised numerous times and is often misinterpreted by providers, patients, and medical records staff.

Strategies

The NHII Strategic Plan proposes 2 strategies for resolving these issues[3]:

• Consumer involvement: Secure personal health records, maintained by the patient and his or her physician, insurer, or others, give the patient unprecedented access and control. This not only means a better-informed consumer, but also direct consumer involvement regarding care decisions.

• Accuracy and privacy: Through technology that complies with federal laws governing privacy and security of health information, privacy, security, and quality of electronic medical records could be improved over paper records. Under HIPAA, patients may authorize certain nonroutine uses and disclosures of their identifiable records; misuses of individually identifiable health information, including e-health records, are punishable by law.

With e-health, an SSL is used with the Internet, and, to protect privacy, the patient or caregiver is provided with a unique ID and password. A totally EHR model has been proposed, which indicates the uniqueness of each type of record and the common, shared data elements that are mostly demographic and financial.[3]

GOALS

Although the e-health field varies widely, the common goal is to provide patient-centric[3] or holistic care that includes Internet-based services and support for patients with chronic conditions. In addition, a truly patient-centric service includes the management of medications, symptoms, emotional support, and health information and education for the patient and caregiver (eg, spouse, relative, or partner). The chronically ill and their caregivers (about 35% of online health consumers) have the greatest potential to affect and be affected by Internet healthcare provision.[13] Many individuals living with a chronic illness actively incorporate e-health management into their daily lives.[3,13] Because they may not know which Web sites provide accurate information, patients and caregivers need customized Web portals that provide pull-down menus or links to credible health information Web sites designed to help with specific conditions or problems. In addition, guided use of credible, Web-based support groups provides a level of peer support that enables many elderly to forestall or prevent admission to a nursing home or hospital. The American Heart Association (AHA) provides an example of a Web site developed for older adults with congestive heart failure (http://www.americanheart. org/presenter.jhtml?identifier=3006028). The National Library of Medicine (NLM) developed guidelines for credibility, accessibility, and readability of Web sites in healthcare and special Internet pages
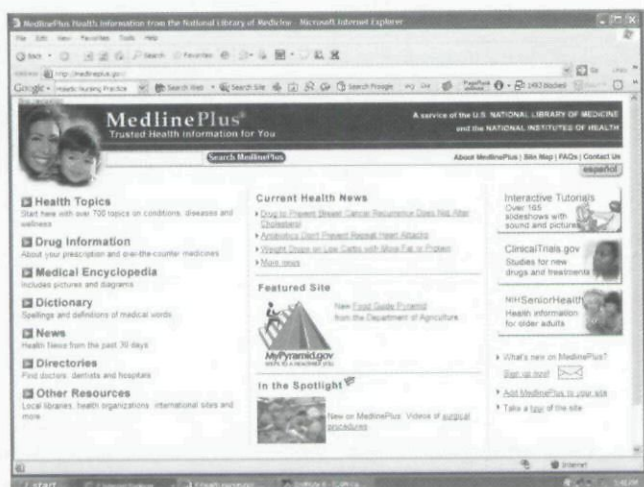
FIGURE 2. An example of a preferred Web site for seniors.

(NIH Senior Health: http://www.americanheart.org/presenter.jhtml?identifier=3006028). MedLinePlus is another useful NLM site (http://medlineplus.gov/ [Fig 2]). With a Web portal, approved healthcare education links can easily be added and customized to meet the needs of the patient and caregiver.

THE FUTURE OF E-HEALTH

It may be difficult for some to imagine how informatics can be applied to clinical practice. The 2 following e-health scenarios illustrate how informatics can be incorporated with technology and the Internet to deliver primary healthcare services by nurses and NPs in ways previously not considered possible. The scenarios are based, in part, on the author's clinical specialty pulmonary practice and a funded grant designed to pilot test an e-health Web portal for COPD patients. The names used in the scenarios are ficticious.

Scenario 1

Joe and Mary Smith live in a small, rural Florida town about 45 miles from Joe's pulmonologist's urban office. Joe, aged 82, has been diagnosed with severe chronic bronchitis and emphysema (CBE) for longer than 25 years, and he requires constant oxygen. In the last year, he experienced 3 acute bronchitis exacerbations, requiring 3 ED visits. Mary, a small, frail hypertensive woman nearing age 80, has severe rheumatoid arthritis and needs frequent doctor visits for chronic pain and joint swelling. Joe and Mary's 2 sons live in Seattle and can only visit once a year. It is

extremely difficult for Mary to drive Joe to doctor appointments or ED care because she must help him in and out of the car and wheelchair and adjust his 20-pound oxygen tank. The last ED visit occurred at 12:00 PM, with a 6-hour wait before seeing a physician; chest radiology, sputum for culture and sensitivity, and blood gases were analyzed. After 2 hours, a physician viewed the tests and placed Joe on antibiotics for 5 days, with instruction to increase his fluids and continue his current bronchodilators. He was instructed to return in 2 or 3 days if his symptoms worsened.

Scenario 2

It is now 2010; Medicare and third-party payers reimburse in all states and allow NPs to e-prescribe in all states. Healthcare may be difficult to access, but customized e-health is available via an Internet Web portal.[14] John, an 82-year-old white man with end-stage COPD, and his wife, Alice (his caregiver for longer than 20 years), have used the Internet for about 5 years, exchanging pictures of their grandchildren and sending e-mails to family and friends. When the NP in John's pulmonologist's office (60 miles from their home) suggests they sign up for the e-health COPD program, they jump at the chance (Fig 2).[7] The NP trained John and Alice during a 1hour office visit. In addition, they were given a training CD to use at home. Alice likes the journaling feature: She can "blog" with other caregivers. John uses the Web portal each day to record his symptoms and to read the Web portal news. Occasionally, he e-mails the NP to question the use of his nebulizer or request a refill. John has scheduled monthly virtual visits online with the NP and has 2 office visits a year with his

FIGURE 3. Prototype e-health system, with the patient's home as point of care.

physician. During the year before using e-health, John saw his physician 13 times and had 3 ED visits; there have been no ED visits in the last year.

NHII identifies 4 major collaborative goals, with 12 strategies for advancing and focusing future efforts toward a fully digitized healthcare system in the United States.[3] Several states have formed regional health information organizations to develop strategic plans for adoption of EHR and IT systems, with progress differing widely from state to state. Meeting the national goal of having all healthcare agencies fully digitized, including the use of e-health, by the year 2010 remains to be seen.

In 2000, Cain and colleagues[13] accurately projected that the first stage would follow a shakeout by business category, leaving only a few survivors in each e-health niche; this near-term stage would be market-driven, with only those players able to show an investment return continuing to receive substantial venture capital support. In addition, Cain predicted that a longer-term and more significant shift would occur from 2003 to 2005, as increasing numbers of companies see the advantage of an online business platform. The accumulation of a critical mass of healthcare data and agreement on information standards will lead this stage. Certification of vendors and e-health providers will provide additional assurance to baby boomers who will create the demand to receive e-health in the home while maintaining privacy and security.

As it becomes increasingly apparent that e-health effectively reduces healthcare costs, improves safety and quality of care, and provides a return on healthcare investment, it is important for nursing to define its niche and play a major role in helping patients and caregivers recognize a return on their health and quality of life.

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