Nursing and the informatics revolution

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The Institute of Medicine's quality initiatives have collectively emphasized the importance of information technology to the transformation of health care. Not coincidentally, federal initiatives in 2004 have signaled the start of "the decade of health information technology." Building on those reports, this article describes the informatics revolution in process, and nursing's readiness to move in that direction. The promise of informatics in reshaping practice is sketched out in terms of seven aims for improvement, followed by a listing of some of the issues that must be addressed for nursing to realize those possibilities. In similar fashion, changes in academia are discussed both in terms of the promise of informatics applications and the barriers to achieving that preferred future. The article ends with some policy recommendations and reflections on opportunities at hand, particularly the growing emphasis on patient self-management support.

Through its various quality initiatives, the Institute of Medicine (IOM) is playing a key role in energizing the informatics revolution taking shape. Even before the IOM's publication in 2000 of the landmark report *To Err Is Human*,[1] which drew national attention to the importance of using information technology (IT) to develop safer systems, it had already published 2 editions of *The Computer-Based Patient Record*,[2] which listed the many purposes that could be served by an electronic health record (EHR). A year later, *Crossing the Quality Chasm*[3] elaborated on the importance of IT to all aspects of health care: financial/administrative transactions, clinical decision-making, consumer information, public health, professional education, and research. That same year, *Improving the Quality of Long-Term Care*[4] noted the need for automated information systems to improve care in nursing homes. Projects ready for implementation into practice were the focus of *Fostering Rapid Advances in Health Care*,[5] and many of those highlighted involved information and communications technology.

By 2003, IOM sought to outline a new vision for the education of those who would bridge the quality chasm. "Utilizing informatics" was described as a core competency for public health professionals[6] and, indeed, for all healthcare professionals.[7] The 2004 report that then focused attention on the special role that nurses play in keeping patients safe[8] stressed the concept of nurses as knowledge workers creating learning organizations supported by IT. Not surprisingly, *The 1st Annual Crossing the Quality Chasm Summit*,[9] held soon thereafter, treated the use of information and communications technology as a crosscutting strategy essential to all reform. Taken as a whole, one can conclude that practice and education are undergoing transformational change, and nurses, who have described themselves as knowledge workers,[10,11] are increasingly being challenged to shape systems so their care can become truly knowledge-driven.

The Decade of Health Information Technology

Prompted in part by these IOM reports, President Bush announced on April 27, 2004 that Americans should have interoperable electronic health records (EHRs) within the decade. Soon thereafter, Secretary of Health and Human Services, Tommy G. Thompson, named David J. Brailer, MD, PhD to be the first Health Information Technology Coordinator, and together they unveiled their framework for strategic action on July 21st. Four major goals were outlined which can be paraphrased thus: (1) encourage EHR adoption and diffusion; (2) interconnect clinicians so consumers move seamlessly from one provider and point of care to another; (3) personalize care by informed consumer choice; and (4) improve population health through timely reporting of findings to public health officials.[12] At the end of that day, Dr. Charles Safran, president of the American Medical Informatics Association (AMIA), sounded the call for the preparation of 6000 more physicians and 6000 more nurses as informaticians to begin to move in this direction.

Nursing had prepared for the decade of health information technology in many ways from the American Nurses Association's recommendations for standard nursing classification schemes[13] and develop-

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ment of a *Scope and Standards of Nursing Informatics Practice*[14] to the Division of Nursing's *A National Informatics Agenda for Nursing Education and Practice*[15] and a national nursing research agenda focusing on nursing informatics as a means of enhancing patient care.[16] A Nursing Informatics Collaboration Task Force—representing nurses within the AMIA, Healthcare Information & Management Systems Society (HIMSS), Capitol Area Regional Informatics Nursing Group (CARING), etc.—had provided testimony in April to the President's Information Technology Advisory Committee (PITAC),[17] and that collaboration led to the formation of the Alliance for Nursing Informatics now representing 20 national and regional groups. But do these proactive activities by some mean that the profession as a whole understands the promise of information technology and is prepared to move forward?

Practice—The Promise of Information Technology

Nurses have turned to IT primarily as a means of improving care and secondarily as having potential for addressing the current nursing shortage.[18] For example, the American Academy of Nursing sponsored a conference on using innovative technology to decrease nursing demand and enhance patient care delivery.[19] The Maryland Statewide Commission on the Crisis in Nursing sought exemplars of ways that IT is being used to improve the work experience of nurses—augmenting in-house nursing staff with remote support staff; ensuring adequate staffing and skills mix with computerized systems that identify schedule preferences; wearing near-hands-free communication devices to stay in real-time communication with colleagues; and utilizing a hospital's nursing intranet to look up protocols, procedures and standards of care, as well as to deliver alerts, announcements, and educational materials.[20]

Sharing innovations can be instructive, but individual examples may inadvertently encourage scattered change when the real promise of IT is its ability to be transformative and achieve foundational aims[3]: safety, effectiveness, patient/family centeredness, timeliness, efficiency, equity, and global connectedness.

Safety is expedited because IT can make possible continuous monitoring, seamlessness at points of transition between care settings when mistakes are most likely,[21] and appropriate information-sharing when clinicians make decisions.[22] Intensive-care nurses have gotten used to technology; for example, machines that sound an alarm when their patients' vital signs go in dangerous directions. Similar "event monitoring" functions can be built with IT that alert the nurse to drug contraindications and other predictors of problems.

Effectiveness is accomplished when IT systems facilitate dissemination of standards/policies, and allow benchmarking for quality improvement.[23] Quality improvement committees around the country are now tracking the achievement of best practices using a range of quality indicators—HEDIS (Health Plan Employer Data and Information Set), the Joint Commission for Accreditation of Healthcare Organizations (JCAHO)'s ORYX, OASIS (Outcome and Assessment Information Set), etc.—though these approaches fail to link processes to outcomes.[24] Typically, these indicators focus on whether services were provided, rather than on whether patients and their families either understood or acted upon the information provided.

IT can promote **patient/family-centeredness** by supporting patients and their families in their decision-making, (eg, recommending asthma Web sites for parent education[25] or delivering patient reminders),[26] and by mitigating social isolation and loneliness through e-mail and on line communities, (eg, connecting family caregivers of persons with dementia).[27] Smart technology can unobtrusively monitor changes in a person's activities of daily living at a distance, thus permitting seniors the advantages of watchful help without leaving their homes. The Nursebot Project is a joint endeavor between nurses and engineers aimed at developing a personal robotic assistant for the homebound.[28]

Timeliness is achieved when IT permits "just in time" (as opposed to "just in case") interventions.[29] The Veterans Health Administration's (VA's) new Care Coordination and My HealtheVet programs make possible continuous communication between patients and providers, thus eliminating routine clinic visits and focusing instead on seeing patients when needed.

Efficiency is enhanced when IT removes redundancies (eg, asking same questions or repeating lab tests),[30] and makes possible targeted interventions. Nurses are using individual information and layering that over Geographic Information Systems to explore health disparities, monitor disease outbreaks, and prioritize limited resources.[31,32] This kind of care permits outreach that is customized by zip code.

Equity can be addressed through IT by facilitating access (eg, telehospice,[33] and making information on discharge available in the patient's language). IT programs that are blind as to race, gender, age, economic status, and physical appearance may be useful in some situations where providers have been known to be influenced by their prejudices.

In addition to the 6 aforementioned IOM-articulated aims, IT also makes possible **global connectedness**, permitting a no-borders approach to health care,[34] now that we increasingly understand that patient safety is an international priority.[35] Nurse practitioners can handle emergencies remotely and travelers can "ask a nurse" across vast distances.