Health Care Informatics: Where Caring and Technology Meet

By Marion J. Ball, EdD and Judith V. Douglas, MHS

The conference provided a forum to showcase the ways emerging information technology can enhance traditional learning and communication for health care practitioners. To set the stage for the articles in this section that focus on conference and partnership technology work, the following piece, which is reprinted from Healthcare Informatics magazine, outlines the potential for the revolution in technology to improve medical practice and professional development. Informatics, as the authors point out in this article, is the broad rubric encompassing information science, everything from data bases to facilitate record keeping to transmission of diagnostic images via the Internet.

Informatics is a new concept for health care and can be defined in a number of dimensions.

In terms of time, health care informatics is quite simply the next generation after traditional health care information systems. In terms of function, health care informatics is where caring and technology meet. In nursing, the clinical laboratory, radiology and the pharmacy, informatics is the application of information technology to enhance the quality of care, facilitate accountability and assist in cost containment. These, of course, are the demands that all health care professionals are now struggling to meet: better health care at a lower cost. Applied information technology, or health care informatics, is a means to this end.

In terms of its derivation, health care informatics is an idea born in Europe, where informatics programs started in the early 1970s when the term informatics was adopted. In terms of its future, informatics is a field that is now engaging some of the most original and creative minds in the health care professions, both here in the United States and throughout the world.

Some of these pioneers of informatics are in medicine, where the term medical informatics is used; some in nursing, where nursing informatics is becoming a more commonly recognized term; and some are in dentistry, where the profession is taking new steps toward dental informatics. The generic term, health care informatics, stresses the interdisciplinary nature of the field and underscores the need for all health care professionals to be involved.

In an article to be published in the *International Journal of Bio-Medical Computing*, Reinhold Haux, chairman of an international working group on medical informatics education, defines medical information as "the discipline concerned with the systematic processing of data, information and knowledge in medicine and health care….The ultimate goal should always be to improve the quality of health care and to improve research and education in medicine and in the health sciences." Haux characterizes medical informatics as "a cross-sectional discipline for virtually all other disciplines of medicine and of the health sciences."

Developments in health care informatics give rise to some serious questions and major challenges for all health care professionals. Will we be able to create the organizational conditions that allow the new visions to come to fruition and the new concepts to be realized? Will we be able to exploit the unique capabilities of informatics and these new information technologies? Will we use informatics to transform health care and to mobilize the potential of health care organizations? There is for us all a stark reality: If we do not do so, we will be stranded in a new world with an old solution. If we neglect the informatics capabilities now at hand and decline to advance computer-based technology, and ignore the need for a new vision of work and organization, we will forfeit the benefits it can provide.

Information technology systems that strive to lower cost often try to completely automate jobs previously performed manually. Information technology systems that strive to add value-

-that is, generate new products--emphasize the dramatic interaction between the user and the technology.

Restructuring the Workplace

The key will be in restructuring the workplace, fundamentally redesigning and transforming workflow within health care organizations. To this end, both the International Medical Informatics Association (IMIA) and the American Medical Informatics Association (AMIA) have working groups devoted to these issues. Attending to "soft" issues, sometimes called "peopleware," is recognized as critical to the successful use of the hardware and software now available.

The supporting technology is an integral part of the architecture in this redesigned environment. Networking becomes the standard, and the personal workstation becomes "a window to the world." Hardware interfaces and software integration--the tools that relational databases and powerful languages provide--all can be combined to create a seamless system tying the individual user into the entire information system.

To create a user-friendly computing environment, organizations need to adopt an outreach philosophy, fostering new relationships between central personnel and end users and encouraging new liaisons and collaborative undertakings. As new applications become available to support clinicians and administrators in providing care, a new caliber of information resources leadership is needed.

With the evolution of the still controversial role of the chief information officer (CIO), health care can move beyond the management of information systems to focus on strategic issues. More and more, health care organizations are relying on strategic planning and turning to a process that results in measurable progress--progress dependent upon critical success factors, among them top level support and full institutional commitment.

The challenge is to oversee an array of computers used in widely different ways. To do this, the CIO and the CEO alike must understand computing as a set of tools which health professionals and hospital staff can use in managing and delivering health care. In short, they must see health care informatics as the key to a new world of improved patient care.

Improving the Delivery of Care

Patients and professionals alike stand to benefit from health care informatics. Consider a few examples from high revenue producing areas of radiology, surgery, and the clinical lab. With CAT and PET scans, with MRIs and NMRs (nuclear magnetic resonance), radiology departments have been transformed into imaging centers. Holography offers multiple, three-dimensional views and the potential for exciting, new noninvasive techniques, for example, using visualization with lasers for arterial angioplasty. In the clinical laboratory, informatics applications hold the promise of noninvasive collection and robotic handling of specimens--boons to the patient and, in this age of AIDS, to the lab worker as well.

Other areas of informatics activities are certain to affect the quality of health care. Today, the development of integrated delivery systems in the United States is spurring the movement toward the computer-based patient record. Innovations in telemedicine are changing the delivery of specialist care, most notably in radiology and dermatology. Decision support systems build upon practitioners' own knowledge bases to revise and improve care. Critical pathways and clinical guidelines are helping steer hands-on patient care and helping redefine clinical processes. Computers can help practitioners overcome the limits of human memory by linking clinical findings with knowledge data bases and identifying possible diagnoses.

Health care providers will be able to access their hospital-based system and to move across computer gateways to other departments, other institutions, and other data sources. Networking via fiber optic cable will allow the user to take advantage of other applications. With networked workstations, professionals can access information when, where, and how they need it.

The real promise lies in health informatics, practiced by health care professionals for health care professionals. Health care informatics is not a wildly futuristic vision. It is an evolving discipline now. In the near future, health care will realize the promise of informatics in education, research, administration and patient care. The interdisciplinary collaboration that gives informatics its tremendous vitality and promise is apparent on many fronts.

Organizations like IMIA, AMIA and the Healthcare Information and Management Systems Society continue to serve their constituencies, and not a week goes by, it seems, without an announcement of an upcoming seminar, conference, or short course in the area of health care informatics.

All these organizations, along with the World Health Organization, will be key in helping to harness the powers of technology. Not only will the United States gain, but so will the entire international community. With the enhanced ability to communicate, learn and heal with the assistance of information technology, health care practitioners now have new tools to improve the health care of not just their own patients, but ones half a world away.

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