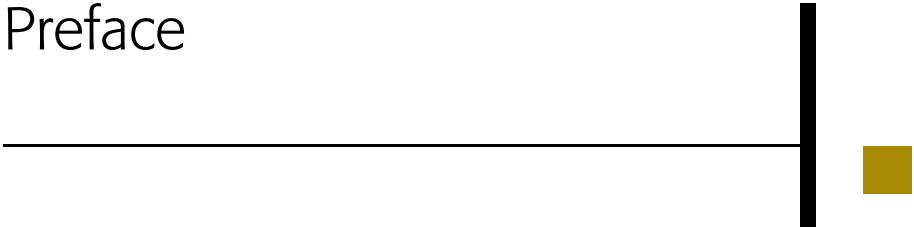


Preface



The theme of this special issue of the *IBM Systems Journal* is information-based medicine. The issue describes how information technology (IT) enables advances in the fields of biomedical research, the practice of medicine, and the delivery of health care. The issue emphasizes the role of computing systems in transforming medicine and translating basic medical discoveries into clinical care.

At the heart of the transformation of medicine is the ability to share medical data. We begin the issue with a set of four papers on interoperability and standards. Eggebraaten, Tenner, and Dubbels, in “A health-care data model based on the HL7 Reference Information Model,” describe a reference data model for health care based on the Health Level Seven** (HL7**) standard. Eckman et al., in “Varieties of interoperability in the transformation of the health-care information infrastructure,” summarize the types of architectures that are being implemented to enable health-care technology interoperability. In “The Health Record Banking imperative: A conceptual model,” Gold and Ball describe a functional model and the rationale for a new aggregator of health information—a health record bank. Finally, Shabo and Dotan, in “The seventh layer of the clinical-genomics information infrastructure,” describe efforts to extend HL7 from basic clinical care to personalized medicine through the development of standards for clinical genomics.

Part of the transformation of health care involves new health-care delivery models. In the second section of the *Journal*, we discuss imaging and telemedicine. Weinstein et al., in “The innovative bundling of teleradiology, telepathology, and tele-

oncology services,” describe the UltraClinics** process—a technology that bundles teleradiology, telepathology, and teleoncology services and in so doing reduces diagnostic and therapeutic wait times for breast cancer patients from weeks to a single day. Kirsch et al. in “Monitoring chronically ill patients using mobile technologies,” and Blount et al., in “Remote health-care monitoring using Personal Care Connect,” describe the use in field trials of pervasive technologies to remotely monitor at risk or chronically ill individuals. These technologies enable in-home care at a new level of quality and affordability for many people with chronic conditions.

As information sources become increasingly rich and available, health-care practitioners and biomedical researchers require decision intelligence tools to help them make sense of the data and derive actionable knowledge from the vast array of information available to them. This is the domain of clinical decision intelligence. Inokuchi et al., in “MedTAKMI-CDI: Interactive knowledge discovery for clinical decision intelligence,” describe the MedTAKMI-CDI system. MedTAKMI is an online analytical processing system that enables interactive discovery and has been prototyped in a study of 7000 patients at the Japanese National Cancer Center. In “A graph-theoretical approach for pattern discovery in epidemiological research,” Mushlin et al. describe data-mining methods that are used to discover patterns of association between genetic information and environmental exposure to disease risk factors. Wang, Nayda, and Dettinger, in “Infrastructure for a clinical-decision-intelligence system,” describe a reference architecture for clinical decision

intelligence designed to facilitate health-care decision making on demand.

In the issue's final section, we explore two new trends in basic biomedical research. Ölund, Lindqvist, and Litton, in "BIMS: An information management system for biobanking in the 21st century," describe the information management system being developed at the Karolinska Institutet in Sweden to integrate data from heterogeneous sources and allow the linkage of data on tissue samples to genetic, phenotypic, and environmental information about the samples. Hehenberger et al., in "IT solutions for imaging biomarkers in biopharmaceutical research and development," describe IT solutions that will enable the biopharmaceutical industry to make effective use of molecular imaging data.

In summary, this issue of the *IBM Systems Journal* portrays an exciting scenario for the future of medical research, clinical practice, and health-care delivery, which we believe will truly revolutionize the industry around the world.

It has been a pleasure for us and co-guest editors Richard Bakalar, M.D. and James Kaufman to assemble this issue of the *IBM Systems Journal*. We wish to thank all of those involved in its creation for their vision and their efforts in making this issue a reality.

The next issue of the *IBM Systems Journal* is devoted to compliance management.

Joseph M. Jasinski, Program Director,
Healthcare and Life Sciences,
IBM Research

David I. Seidman, Associate Editor

John J. Ritsko, Editor-in-Chief

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