Foreword

Health and medical informatics encompass a very broad field, which is rapidly developing in both its research and operational aspects. The discipline has many dimensions, including social, legal, ethical and economic.

In the following overview, I would like to share with the readers my thoughts, beliefs and experiences (both academic and practical) regarding the most important and promising fields of the medical information systems domain.

The combination of the two revolutions, that of information and that of telecommunication, is altering medical practice. Telemedicine is changing the shape of medical practice — both in relation to the patient and to interaction between physicians and medical institutions.

Information technology application in healthcare has a long history, triggered from two separate areas of interest. On the one hand, the development of medical instruments has incorporated information technology in a vast number of instances, varying from monitor equipment to CT and MRI scanners. On the other hand, requirements on the registration and processing of medical services and hospital bills, often imposed by government or insurance companies, have led to extensive Electronic Data Processing facilities (EDP), Hospital Information Systems (HIS) and ancillary registration systems.

There are two major objectives implementing healthcare information systems. One is the clinical and research point of view, and the other deals with all the administrative and healthcare economic related issues. Performance Improvement through Information Management compiles a variety of perspectives on the critical role of information technology in health care. A unifying theme is that health information systems differ according to each provider’s unique needs. That is why we have to begin with a comprehensive survey of the market forces affecting health care, because the ability to plan and design appropriate information systems depends on understanding the effects of managed care on their utilization, cost, and quality and the associated information requirements. Then we have to deal with a
strategic analysis and its implications for healthcare information systems and to realize how market structures affect the formulation of information system strategy, noting that there is no cookie-cutter approach for investing in healthcare information technology.

The next stage in our efforts to define an effective healthcare information system is to focus on transformation processes, including planning, information architecture, process design, care delivery and management, and the emerging role of the network manager. I strongly believe that as we do on other market and industry fields such as finance, insurance, industrial MIS etc, we have to continue our process with a strategic information management planning. This approach considers the provider’s strategic direction and uses benchmark data regarding ambulatory systems, clinical data repositories, and Internet applications to formulate an organization-specific plan for investment in healthcare information technology.

On the other hand, from the clinical point of view one may notice a huge progress, in the implementation of the computerized systems into the clinical process. For example, in radiation oncology specialization, medical information has changed the manner of practice. Soon, all procedures will be fully computerized, from the planning stages to the administration, documentation and quality assurance. “Onco-Link”, furthermore, provides, oncologists with up to date trials and treatment information, in addition to serving as an educational resource for the patients and their families.

In general, patients will now be much more exposed to medical data, sometimes insuppressible and uncorroborated data, via the Internet, thus challenging their physicians and impacting on the physician-patient relationship.

Health systems take on new meaning in the midst of the international communication revolution. Health services are a natural candidate to join and even become an integral part of the “Information Highway”. Terms such as Telemedicine, Telehealth, Teleradiology, Teledermatology, etc., have been integrated into technical and academic jargon and have become the object of research and organization.

One of the main objectives of Healthcare information systems is to provide the user with the ability of transforming the data into information. Data warehouses are a relatively new approach in healthcare. Although basically just another database, what sets it apart is that the information it contains is not used for operational purposes, but rather for analytical and decision making tasks. After an episode in
which a patient’s medical care has been concluded, the data collected has historical importance only. Functionally, the data warehouse integrates operational and historical data from multiple, disparate data sources and preserves it by collecting these scattered data fragments. Users can employ the stored data for decision making, both clinical and administrative, and ultimately, for the future well being of patients and for their institutions.

The nature of the data involved with Healthcare Information Systems raises dilemmas concerning privacy and medico legal aspects. Collaborative work would need to be done involves the Ministry of Health, Department of Justice, Medical Quality assurance personnel, Healthcare information systems analyzers and developers, and finally the Congress. All of these in relation to the legislation of electronic information such as data compression in radiology, the legal value of electronic documentation, as well as securing the patients privacy. There are also ethical issues related to medical data. Access to medical information compiled on a person might lead interested parties to draw conclusions about that person’s likeliness to develop a certain disease. Such information could jeopardize one’s chances of employment, or influence a decision on receiving health coverage or other insurance.

Among the most fascinating healthcare information systems research and practice areas we may find:

**Applications and Products to Support Care** - quality management, knowledge-based systems, decision support and expert systems, electronic patient record, image processing, HIS management, patient monitoring, minimum data sets, telemedicine, computer-supported interventions, diagnosis related systems, operations/resource management, management of the supply chain etc.

**Human and Organizational Issues** such as: managing change, human factors, communication management, organization, legal issues (privacy, confidentiality, security), ethics, assessment-evaluation, process, user-computer interface, compliance, cognitive tasks, collaboration, implementation-deployment, diffusion, needs assessment etc.

**Data-Infrastructure related aspects** such as: linguistics, terminology-vocabulary, data acquisition-data capture, data entry, data protection, data analysis-extraction tools, data policies, syntax, database design, classification, coding systems, standards, concept representation-preservation (clinical disciplines), indexing, language representation, lexicons, thesaurus tools, nomenclatures, modeling etc.
*Information Technology Infrastructure* contains subjects as: health professional workstation, networks, chip cards in healthcare, archival-repository systems for medical records, security, interfaces, distributed systems, pen-based technologies, speech recognition, user interfaces, neural networks etc.

The wide variety of computer based platforms and the sophistication of the technology together with a huge volume of data and information needs to support the medical decision-making processes makes the field of Healthcare information systems both magnificent and fascinating. In the near future, we will witness huge research and implementation efforts in the fields related to the Internet and Information highway. Online medical data retrieval systems, as well as consultant services, will establish using the web, instead of the traditional services.

Man Machine Interface will certainly move toward the voice recognition systems, allowing the physicians to dictate their diagnosis and instructions directly to the computer. More integration between “computerized islands” such as MRI, Labs, electronic medical record (EMR), demographically based information systems, Cath labs Information etc, will allow gathering all the medical data regarding the patient, into ONE comprehensive database. That is why, the field of data bases, especially those gathering text, images, motion and sounds, will be the favorites areas for research and development. Together with ethical and legal aspects, various kinds of application and users pose an enormous challenge to the field of Healthcare Information Technology, and promises to keep it at the edge of the information innovation revolution.

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