Informatics: How an Emerging Field of Study Benefits HIM

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by Danita Forgey, MIS, RHIA, CCS, CCS-P, and Jennifer Vickrey, BS

HIM, meet informatics. This could be the beginning of a beautiful friendship.

Technology is introducing HIM to the science of informatics. It's a relationship with a promising future. Informatics concerns the development of new uses for technology and assesses technology's impact on people, processes, and policies.

Informatics has applications across the HIM spectrum, from achieving the data format necessary to maximize electronic health record (EHR) systems to studying the way clinical staff interact with the systems on screen. Informatics is helpful in assessing the integration of technology into long-established institutions such as HIM, offering scrutiny, for example, into HIM's need to protect patient privacy while disseminating and applying ever-increasing amounts of data.

What Is Informatics?

Informatics may be described generally as the science of analyzing, modeling, collecting, and effectively managing data. It is a pure and an applied science-and a field both broad and deep. On a very general level, informatics uses available and emerging computer technology to resolve practical issues. From there, its applications are limited only by the imagination. By providing a foundation for applying current technologies as tools for problem solving, informatics relies heavily on critical thinking and the ability to understand the extensive range of applications of technology.

A curriculum in informatics synthesizes information technology with a second discipline such as health, biology, chemistry, or fine arts. It is a broad-based field that includes research in human-computer interaction (HCI), use and dissemination of extensive and complex information, and policy and socioeconomic issues arising from IT and informatics as applied to other fields.[1]

How Informatics Fosters Interoperability

A major benefit in realizing the goal of an EHR system is longitudinal record-keeping through interoperable systems. The field of informatics is moving HIM forward in achieving system interoperability by exploring ways to structure and apply collected data, digitize information gathered from various sources, and define and classify such information in a consistent manner.

Seeking Structured Data

The benefits of health IT-improved patient care, reduced medical errors, and increased organizational efficiency-require that information be delivered in a particular form, as discrete, structured data. For this reason, it is important to distinguish between the types and formats of data.

While data can be defined in many ways, information science defines data as unprocessed information. Most data is unstructured, meaning that it comes from a variety of sources and is presented in various formats-unstructured text, scanned documentation, and digitized images, for example.[2] Data in this format is simply a collection of facts and lacks meaning.

Converting unstructured data into parsable, structured information-data that is coded, has a specified format with predefined fields, and can be easily retrieved-allows it to be analyzed, compared, and interpreted. Longitudinal record-keeping is strongly based in structured, codified data. Patient demographics and financial information are common examples of structured data. Informatics furthers HIM efforts by exploring ways to codify unstructured data.

An area in which informatics is pursuing efficient and accurate structuring and digitizing of patient information is in the creation of advanced voice recognition technologies. While voice recognition technology has been evolving for more than two decades, without editing it is still not accurate enough to rely on when a patient's health and privacy are at stake. Even systems that perform with 95 percent accuracy are unacceptable for use in patient care delivery.

Informatics is working to develop voice recognition technology that allows vocabularies to be rapidly created without collecting speech samples and that allows users to speak in a natural cadence. The step beyond speech recognition is natural language processing, which prepares extracted and coded language for clinical and administrative applications through text and data mining.[3]

Computerized physician order entry is another rapidly expanding informatics application. Although fewer than 10 percent of US hospitals currently employ the technology, its use is expected to increase as a means to decrease medication errors and other adverse events.[4] This will increase the amount of digitized data in patient records, making it amenable for use with computerized applications that can structure and codify digital information.

Classification Systems and Standards

Standards for classifying collected data allow organizations to communicate and ensure the validity of the data they share. For this reason, there is a drive for consistent clinical vocabularies and classification systems.

Data definitions are at the core of classification standards. Data sharing within one health network alone could be hampered by lack of a data dictionary. Data sharing of a multifaceted longitudinal record would be impossible if the different information systems do not speak the same language.

On this front the field of informatics is striving to expand knowledge of classification systems. Any growth toward EHR systems will be seriously stunted without the critical component of standardized clinical terminology. Standardized terminology is the key to accurate and timely comparisons and effective communication of clinical diagnoses and assessments. Through terminologies such as the Unified Medical Language System (UMLS) and SNOMED Clinical Terms (CT), strides are being made in creating a contained electronic vocabulary that will increase interoperability. SNOMED CT offers controlled clinical terminology with comprehensive coverage of diseases, clinical findings, etiologies, therapies, procedures, and outcomes. UMLS is an ongoing National Library of Medicine project that includes a thesaurus and semantic network to facilitate retrieval and integration of relevant information from disparate sources.

As research moves forward in interoperability and longitudinal patient records, Health Level Seven (HL7) is a key player in setting standards that move the profession closer to those goals. HL7 is an accredited standards organization that is also dedicated to interoperability. In May 2004 HL7 announced an EHR system draft standard for trial use. This draft standard summarizes the functions that may be present in an EHR system and provides a common language for communicating its behaviors and capabilities.[5] Efforts such as these are essential in the development of longitudinal, interoperable health information.

The Future of Informatics and HIM

As more health information becomes digital, the intersection of HIM and informatics will only become stronger. Directly and indirectly, HIM professionals will employ and benefit from informatics in many settings.

As system interoperability grows, HIM professionals have the potential to become vital liaisons across organizational healthcare teams and between various associated entities. Cross-functional knowledge can position HIM professionals to identify opportunities for improvement and take part in standards setting. As HIM professionals play a more prominent role in assessing the issues surrounding the convergence of technology and the profession, they will also hold more responsibility for guiding the development and implementation of health information policy.

HIM professionals also have the potential to take on greater responsibilities as liaisons between providers and consumers. Consumers, already choosing to care for routine tasks like banking and bill paying online, are beginning to expect more online services from the healthcare industry; some providers have already begun to offer limited online access to records. HIM professionals, with training to interpret healthcare data, knowledge of legal aspects of health information, and the ability to

translate medical terminology for consumers, have a prime opportunity to position themselves as leaders in managing electronic personal health records.

HIM professionals will also be facing the challenge of dealing with not only more digital information, but many formats of information. In a 2004 survey, 72 percent of hospitals and health systems reported plans to invest in digital radiology systems; 64 percent in computerized physician order entry systems.[6] As these systems come online, HIM professionals will have to determine ways to store multimedia information in accessible formats. A combination of digital radiology images, scanned documents, paper files, and electronic records may all exist for one patient for one encounter. The challenge will be to provide access to this and other data that exist on a patient, present it in a usable format, and protect the patient's privacy.

Human-computer interaction is the branch of informatics that studies and supports the design, development, and implementation of humanly usable and socially acceptable information technologies. As computer systems become more complex, they change workflows and how employees interact with computers. As managers, HIM professionals have to re-engineer workflow processes and lead information system changes on a regular basis. A greater understanding of HCI will assist managers in systems selection and in the re-engineering process.

HIM professionals with an interest in HCI can combine their knowledge in this field with their technological knowledge to design systems that are more usable and lead to readier acceptance. A familiarity with HCI is necessary in designing forms to be used with computerized systems, designing computer screens, and selecting information systems. HCI is also a good tool to use when working with staff who are reluctant to embrace new technology.

Informatics and HIM also intersect in data reporting initiatives, where data management skills and systems design can improve collection and reporting processes. Healthcare consumers are requesting more comparative data to support healthcare decisions. Employers and insurance companies are requesting comparative data when making insurance benefit decisions and when negotiating contracts with providers. The Joint Commission on Accreditation of Healthcare Organizations requires healthcare providers submit a core data set used for benchmarking purposes, and the Centers for Medicare and Medicaid Services request voluntary quality monitoring data. HIM professionals are often the individuals with the responsibility for identifying, collecting, and reporting this data. Professionals who are involved in the reporting process can use informatics tools to design systems that accurately report the data with a minimum of human intervention and a high degree of accuracy.

HIM faces many challenges but even more opportunities in the migration from paper to digital practice. Using principles developed in informatics, HIM professionals can design systems that automate tasks. Much of the data reported to external agencies is abstracted manually. Imagine a world with computerized records that can be mined using simple queries. The knowledge of clinical vocabularies will allow HIM professionals to use information systems to automatically report the data that is mined manually today. Computer-assisted coding can be done more accurately because there will be more machine-readable documentation.

The skills and knowledge HIM professionals possess position them uniquely for the future. An already multifaceted profession with myriad opportunities is developing even more opportunities with the help of informatics.

Notes

1. Indiana University School of Informatics. "What Is Informatics?" Available online at www.informatics.indiana.edu/overview/what_is_informatics.asp.
2. Kohn, Deborah. "Informatics in Healthcare." In Health Information Management: Concepts, Principles and Practice, edited by Kathleen M. LaTour and Shirley Eichenwald. Chicago, IL: AHIMA, 2002, 39-41.
3. Ibid.
4. Koppel, Ross, et al. "Role of Computerized Physician Order Entry Systems in Facilitating Medication Errors." Journal of the American Medical Association 293, no. 10 (2005): 1197-1203.
5. Dougherty, Michelle. "Understanding the EHR System Functional Model Standard." Journal of AHIMA 76, no. 2 (2005): 64A-D.
6. "Report Forecasts Growth in Hospital Spending, IT Investment." iHealthBeat, March 1, 2004. Available online at www.iHealthBeat.org.

Visualizing the Human Gene

An Example of Informatics Applied to Medicine

Great advances are being made with the application of informatics to the medical field. In one example, the School of Bioinformatics at Indiana University-Purdue University Indianapolis and Indiana University Bloomington are expanding research of the Human Genome Project. Through support of a grant from the Lilly Endowment, the Indiana Genomics Initiative in conjunction with the universities' Advanced Visualization Laboratories (AVL) is allowing researchers to further explore the human gene through visualization, virtual reality, and visual collaboration.

The AVL allows the visual exploration of the 30,000 genes that comprise the human genetic makeup. The technology will fulfill this function through the ability to rapidly compute huge amounts of data and ultimately move research quickly and accurately from the laboratory to practice. Researchers can view interactive three-dimensional renderings of their subjects and manipulate that rendering through use of coloring, lighting, or slicing to better view the area of interest. In this way, they can spot trends and anomalies that may hold the key to the prevention, diagnosis, and treatment of diseases.

Source: Advanced Visualization Lab, Indiana University. "Advanced Visualization for the INGEN IT Core." Available online at www.avl.iu.edu/ingenviz.

Danita Forgey *(dforgey@iupui.edu) is program director and assistant professor at the health information administration program of the Indiana University School of Informatics. Jennifer Vickrey has a BS in English and has done extensive work in copywriting and technical publications in various industries. She is currently a student in the New Media Arts and Sciences program at the Indiana University School of Informatics.*

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