

Editorial Preface

Information Logistics

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SUMMARY

Information logistics is an important issue for health information systems and informatics. This editorial provides a case description of a patient visiting an emergency room in the United States. The documentation of the information handling during the visit demonstrates the lack of sufficient use of information technology in health care. More systematically, this editorial addresses the seven lines of development for health information systems that were recently defined by Haux (2006), and the papers published in this issue of the *International Journal of Health Information Systems and Informatics* are ordered accordingly.

EDITORIAL

During my sabbatical in the United States, I was forced to visit an emergency room (ER) because of an acute inflammation of a joint. Based on a suggestion by colleagues, I visited a recognized clinical center in the Washington, D.C., area:

- Firstly I was asked for my name and the reason for coming; the nurse documented this information on a copied paper form, more precisely, a letter sheet that was cut using a ruler.
- The doctor interviewing me documented the anamneses directly into a personal computer (PC) system, which was mounted on a device that also was carrying the blood pressure and heart-pace recording system. Although I have misgivings about whether these recordings were transferred automatically into my health record, the measurement of my body temperature was for sure entered manually.
- X-rays of the joint were ordered and a nurse escorted me to the x-ray department, not only to ensure that I would safely find my way through the building, but primarily to pass the printed order to the radiologists, who was working as an autonomous doctor inside the hospital and providing his own billing.
- X-ray imaging was done using a conventional device that was fed with a digital cassette. Since I asked for a digital copy of the images, a CD-ROM with the digital imaging and communications in medicine (DICOM) file and a viewer application were given to me. Although standard DICOM viewers, such as Osiris¹ 4.0, are able to open the images, the disk did not conformant with the integrating the health care enterprises (IHE) integration profile for portable data for imaging (PDI) (ACC/HIMSS/RSNA, 2005).
- Then, I was sent to the doctor making the diagnostic decision. He interviewed me and documented his findings by marking checkboxes on his paper-based form. The diagnosis and further information on the illness as well as on the suggested therapy was printed and accompanied by a handwritten prescription, which I was unable to read at all.

- Finally, when passing the prescription to the pharmacists, my name, address and phone number were recorded again. The drug box that was provided carried a printed label with my name and the information on dose and frequency of application—hopefully as it was handwritten on the prescription.

This story could have happened in Germany or anywhere else in the world, except that not all radiologist operate digital equipment, and, therefore, the CD would have been a film-based hard copy.

However, the title of this editorial reads “Information Logistics,” a term that was established 30 years ago by Reichertz for describing health information systems and informatics with the aim of providing the right information at the right time and the right place (Reichertz, 1977, 2006). From my story, it is obvious that the day-to-day routines in medicine and health care urgently need further information logistics improvement. In addition, medical informatics must focus on target groups, which include not only the medical or administrative professionals, but also the patients and their relatives. Electronic health (-care) records (EHR) and electronic medical information or knowledge (e-health), for example, provided on the Internet, are being discussed in the scientific community. For instance, at the Medical Informatics Europe conference (MIE 2006) that was held recently in Maastricht, The Netherlands, 33% of the sessions had titles with health information systems (HIS), EHR, or e-health, and another 20% included decision support. This clearly indicates the primary aim of today’s research in the field.

More systematically, Haux has analyzed the past, present, and future of medical informatics and health information systems. He identified a set of seven major fields of importance (Haux 2006). Six of the seven fields will be addressed in this issue:

1. The shift from paper-based to computer-based processing and storage of medical information—an article by MacGregor, Hyland, Harvie, and Lee analyzes the use of information and communications technologies by general practitioners (GP) with respect to the gender of the GP.

2. The shift from institution-centered towards regional and global HIS—Nepal, Zic, Jaccard, and Kraehenbuehl address the problem of assuring secure and confidential access and transfer of EHRs within and between facilities in autonomous health care systems.
3. The inclusion of patients and health consumers as HIS users—In this broad area that has been the focus of recent research, Web-based patient information is an important issue. With respect to chronic kidney diseases, Nanovic and Jaffery systematically evaluate usability, quality, and content of Web sites for educating patients.
4. The use of HIS data for health care planning and research—decision support is one of the oldest applications of medical informatics. The systemic view provided by Raghupathi suggests a novel holistic approach, such as an intelligent multi-agent for clinical reasoning, and traditional rule-based approaches for clinical function applications.
5. The shift from focusing on technical problems to change management.
6. The shift from alpha-numeric data to images—diagnostic imaging is an essential part of clinical routine, and today’s HIS face an increasing amount of digital image data. While sophisticated research has been done on content-based access to medical images (Müller, Michoux, Bandon, & Geissbuhler, 2004), Villegas, Montilla and Villegas address the basic problem of interchanging DICOM directories.
7. The inclusion of ubiquitous computing environment—Wireless, handheld devices are prominent examples of ubiquitous computing, and Woollatt, Koop, Jones, and Warren present a decision-support system that is based on these devices.

So in conclusion, the articles selected for this issue of the *International Journal of Health Information Systems and Informatics* cover the broad spectrum of ongoing research. They may contribute towards a near future, when an ER visit will be recorded automatically and completely in a Web-based EHR that is accessible for health care professionals and patients. More

precisely, this EHR will allow for viewing of the x-rays that were taken just a few seconds ago by simply clicking the link in an Internet browser. Furthermore, links to educational information will be provided automatically, according to the diagnosis and findings made by the physician. Restricted by a suitable role and user concept, the EHR will be shared with other physicians involved in the treatment of the patient. All prescription would be documented in the EHR and transferred electronically to the preferred pharmacists. They will be processed by the time the patient visits the pharmacist to pick up the prepared medication, and based on the EHR, all relevant information will be passed automatically to the organization for billing and insurance...

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ENDNOTE

- ¹ Service for Medical Computing (SIM), Department of Radiology, University Hospitals of Geneva (HUG), Switzerland http://www.sim.hcuge.ch/osiris/01_Osiris_Presentation_EN.htm

Thomas M. Lehmann received the master's degree in electrical engineering (school of engineering), the PhD degree (summa cum laude) in computer science (school of science), and the habilitation in medical informatics (school of medicine) from the Aachen University of Technology (RWTH), Aachen, Germany, in 1992, 1998, and 2004, respectively. Since 1992, he has been with the Department of Medical Informatics, RWTH Aachen, where he currently heads the Division of Medical Image Processing at the associated professor's level (Privatdozent). In 2006, he joined the Lister Hill National Center for Biomedical Communication, National Library of Medicine (NLM), National Institutes of Health (NIH), USA for a six-month sabbatical. He co-authored a textbook on medical image processing (Springer-Verlag, Berlin, Germany, 1997) and edited the Handbook of Medical Informatics (Hanser Verlag, Munich, Germany, 2005). He is senior member of the Institute of Electrical and Electronics Engineers (IEEE), and member of the International Association of Dentomaxillofacial Radiology (IADMFR), and the Society of Photo-Optical Instrumentation Engineering (SPIE). He serves on the International Editorial Board of Dentomaxillofacial Radiology and is co-editor Europe of the International Journal of Health Information Systems and Informatics.