Semantic Interoperability in Multimedia Distributed Health Record

Petr HANZLÍČEK ¹, Miroslav NAGY, Petra PŘEČKOVÁ, Antonín ŘÍHA, Matej DIOSZEGI and Jana ZVÁROVÁ
EuroMISE Centre, Department of Medical Informatics, Institute of Computer Science AS CR, v.v.i., Prague, Czech Republic

Keywords: Electronic Health Record, Semantic Interoperability, Nomenclatures

The electronic health record (EHR) has been studied in the EuroMISE Centre for a long time. During this time, a wide range of electronic health record systems was created. The first EHR named the Multimedia Distributed Record (MUDR) introduced a flexible information storage model, modeling capabilities, and medical guidelines support. The MUDR EHR has been continually developed for several years; the last revision is the platform-independent Java based system called MUDRj. The semantic content of developed EHRs was defined by the set of medical attributes important for the diagnosis of cardiological patients. This set was based on a consensus of many cardiological professionals and named the Minimal Data Model for Cardiology (MDMC). This model was a basis for data collection in the outpatients' department of preventive cardiology operated by two Czech hospitals of the EuroMISE Centre on the premises of the Institute of Computer Science AS CR, v.v.i.

Within the frame of the national research project, our research in the field of semantic interoperability is based on the development of methods and techniques of remote access to the information in a form of data and knowledge in relationship with electronic health documentation. One of the main research tasks is the design, implementation and usability verification of a shared EHR as a tool for continuous shared health care. Among other activities, the open semantic interoperability environment, based on international standards, ontologies and classifications, especially HL7 ver.3, UMLS, LOINC and SNOMED CT, is designed and implemented, taking into account the national legislative and organization conditions. Two different EHR systems with their information content in the field of cardiology based on MDMC have been tested. Using the HL7 methodology, the local information models of both EHR systems were created and necessary mapping of collected variables using international classifications and nomenclatures has been prepared. Some complications were caused mainly by different granularity of concept representation in EHR systems and major classification systems as well as problematic term definitions and standardizations.

Research was partially supported by the project 1ET200300413 of the Academy of Sciences CR and partially by the research institutional plan AV0Z10300504 of the Institute of Computer Science AS CR, v.v.i.

¹ Corresponding Author: Petr Hanzlicek, EuroMISE Center, ICS AS CR, v.v.i. Pod Vodarenskou vězi 2, Prague, 182 07, Czech Republic. E-mail: hanzlicek@euromise.cz.