

# Universal Electronic Health Record MUDR

Petr HANZLICEK, Josef SPIDLEN, Miroslav NAGY  
*EuroMISE Center – Cardio, Institute of Computer Science AS CR,  
Pod Vodarenskou vezi 2, 182 07, Prague 8, Czech Republic*

**Abstract.** An important research task of the European Centre for Medical Informatics, Statistics and Epidemiology – Cardio (EuroMISE Centre – Cardio) is the applied research in the field of electronic health record design including electronic medical guidelines and intelligent systems for data mining and decision support. The research in the field of data storage and data acquisition was inspired by several European projects and standards, mostly by the I4C and TripleC projects. Based on experience gathered during cooperation in the TripleC project we have proposed a description of a flexible information storage model. The motivation for this effort was a big variability of the set of collected features in different departments, organizations and also during time, therefore a dynamically extensible and modifiable structure of items is needed. In our model we use two basic structures called knowledge base and data files. The main function of the knowledge base is to express the hierarchy of the collectable features – medical concepts, their characteristics and relations among them. The data files structure is used to store the patient’s data itself. These two structures can be described using the graph theory expressions. Based on this model, a three-layer system architecture named “Multimedia Distributed Record” (MUDR) was proposed and implemented. During the implementation, the modern technologies like Web Services, SOAP and XML were used.

For the practical usage of EHR MUDR the intelligent application called MUDRc (MUDR Client) was created. It enables physicians to use EHR MUDR in a flexible way. During the development process maximum emphasis was placed on user-friendliness and comfortable usage of this application. Several methods of data entry can be used: pre-defined forms, direct entry into the tree data structure of the EHR MUDR, or automatic unstructured free-text report parsing and data retrieval. The system enables fast and simple import and export of data as well. The system integrates modern multimedia formats (X-ray photos, sonography and other pictures, video-sequences, audio records) as well as progressive methods of decision support systems realized by medical guidelines and other modules.