Semantic Interoperability of Medical Information Systems and Scientific Repositories

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Abstract—**This study presents the implementation of European health informatics standards in the Hospital Information System (HIS) and the Scientific Repositories employed in the University Specialized Hospital for Active treatment of Endocrinology. It has the purpose to demonstrate the usage of the archetype paradigm in achieving semantic interoperability in clinical data exchange. This approach enables to transfer several medico-administrative, clinical and laboratory data from the Hospital Information System to the Register of rare endocrine diseases. The Orphanet nomenclature of rare diseases as well as international Logical Observation Identifiers Names and Codes (LOINC) maintained by the Regenstrief Institute, and Systematized Nomenclature Of Medicine Clinical Terms (SNOMED-CT) codes are used for this purpose. Initial computer experiments are demonstrated and discussed.**

Keywords-Semantic interoperability; archetype object model; Health informatics standards; Medical Information Systems; Hospital Information Systems; Clinical registries.

I. INTRODUCTION

This study presents the implementation of European health informatics standards in the Hospital Information System (HIS) and the Scientific Repositories working in the University Specialized Hospital for Active Treatment of Endocrinology, (USHATE), and the transfer of clinical data between them preserving their clinical context.

II. METHODOLOGY

The patient is in the center of the integration of all clinical and administrative data. Documentation and messages conforming to the United Nations rules for Electronic Data Interchange for Administration, Commerce and Transport (UN/EDIFACT) are created [1]. The standard EN ISO 13606 for Electronic Health Record (EHR) communication and archetype paradigm is applied (see Figure 1). Roger's definition for Minimum Basic Data Set (MBDS) is adopted including core of information with the most commonly available set of items and most extensive range of usages [1]. The applied standards and nomenclatures support the semantic interoperability between the systems.

III. RESULTS

Several medico-administrative, clinical and laboratory data can be transferred from the Hospital Information System to the Register of rare endocrine diseases, keeping the context of their registration, structuring the measured results, used nomenclatures and methods in archetype concepts satisfying the Archetype Object Model of EN ISO 13606 [2][3]. In this register, the ICD 10 codes are mapped to the Orphanet nomenclature of rare diseases and respective ORPHA codes. For example, Figure 1 displays patient's names, sex, age and several anthropometric data - Height, Weight, and Body Mass Index. Records concerning the blood pressure include the Systolic and the Diastolic blood pressure, the method and the place of measurement and the technical details as type of device, position, level of the patient effort, inclination of the patient, and other conditions.

IV. CONCLUSION

This approach of standardization at all stages of data transmission gives the possibility to transfer the data between our national register and the international repositories, using the European standard for an International Patient Summary (IPS) (prEN 17269) [4].

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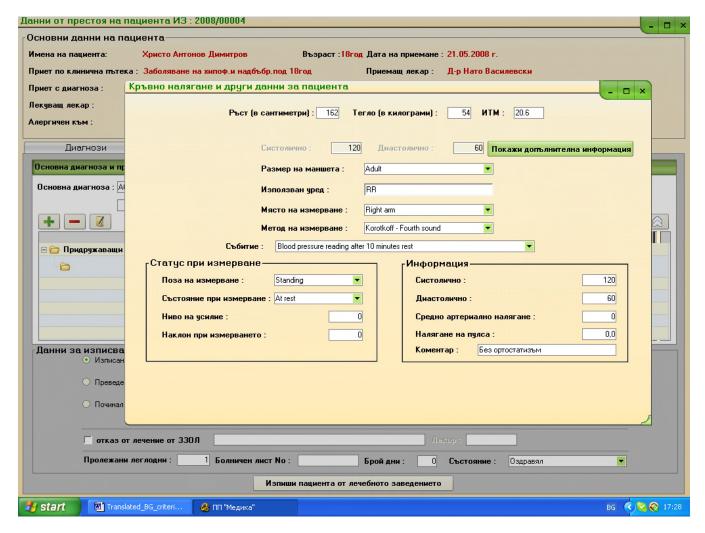
Figure 1. Blood Pressure Archetype (HIS of the University Specialised Hospital for Active Treatment of Endocrinology – Sofia, Bulgaria).