

Modelling and Management of ePrescriptions on openEHR platform in Bulgarian eHealth

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Abstract—Medication prescriptions are widely used in patient-centric eHealth services. In national healthcare they are usually represented employing proprietary information models. This significantly complicates management of prescriptions in electronic format (ePrescription). The lack of interoperability among such ePrescription models increases both the risks of drug prescription errors and the costs for ePrescription processing. The objective of this paper is to outline a methodology for management of ePrescriptions in the scope of Bulgarian healthcare by means of openEHR archetypes. The case study in this research work considers a typical use case in this application domain. A widely used information model of a medication prescription is represented in terms of reusable openEHR archetypes. The use of openEHR entails semantic interoperability and portability of ePrescription instances across health information systems. Results from computer experiments reveal ePrescription benefits like reduced medication errors, increased patient safety and improved management of electronic health records.

Keywords—openEHR information model; archetype object model; ePrescription; openEHR platform.

I. INTRODUCTION

The need for improved quality of health services is one of the main reasons for adopting prescriptions in electronic format (ePrescription) as a preferred way for purchasing medicinal products [1]. The objective of this paper is proposing a methodology for modelling and management of ePrescriptions using openEHR specifications [2]. The following Section II shortly presents the proposed methodology for building an openEHR archetype model comprising typical clinical concepts in national healthcare. The status of deployment and the challenges in the implementation of the proposed approach are presented in Section III. Section IV makes an evaluation of the contributions in this research work in relation to results in the existing literature.

II. METHODOLOGY

The proposed ePrescription model is an openEHR template composed of archetypes corresponding to clinical concepts in existing National Health Insurance Fund (NHIF) prescriptions.

This approach reduces significantly the difficulty and cost in application development. Moreover, it ensures semantic interoperability, reusability of components and portability of patient-centric services across systems.

III. RESULTS

An open source openEHR platform is configured for evaluation the practical implementation of basic functional requirements of the model [3]. The obtained results extend previous research work in the area of cross-border exchange of International Patient Summary [4]. An INSTRUCTION archetype model of ePrescription is created employing openEHR specifications (Figure 1). The model incorporates all the health data in a prescription as it is specified by the NHIF. A multitier web application is developed for database management of ePrescriptions on openEHR platform [2]. The client part of the application communicates with the openEHR platform by means of web services (Figure 2). It is used to create and retrieve ePrescriptions with real-life data employing user friendly web interface. The design of the user friendly web interface enhances the business process for openEHR management of such reports. The information model is implemented in a fully functional web application

IV. CONCLUSION

The here proposed methodology allows to transform existing XML schema definitions used by the Bulgarian NHIF into archetype-based models with inherent semantic interoperability of clinical documents exchanged by other EU countries. The implementation of this methodology is novel in the existing literature, where known ePrescription software applications allow basic functional interoperability of clinical documents. Plans for future results include the development of an application for cross-border exchange of ePrescription that add semantic interoperability to current “epSOS- friendly” ePrescription documents.

ACKNOWLEDGMENT

This research is supported by the National Scientific Program “e-Health in Bulgaria”.

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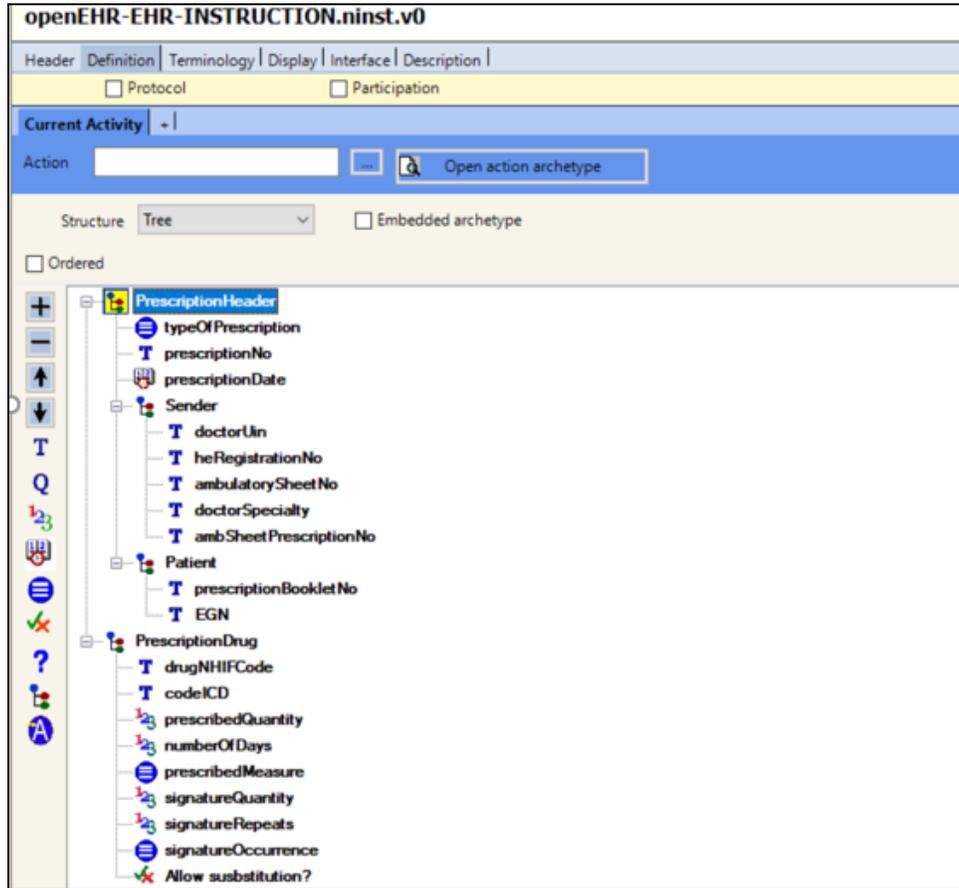


Figure 1. openEHR INSTRUCTION archetype with ePrescription clinical data.

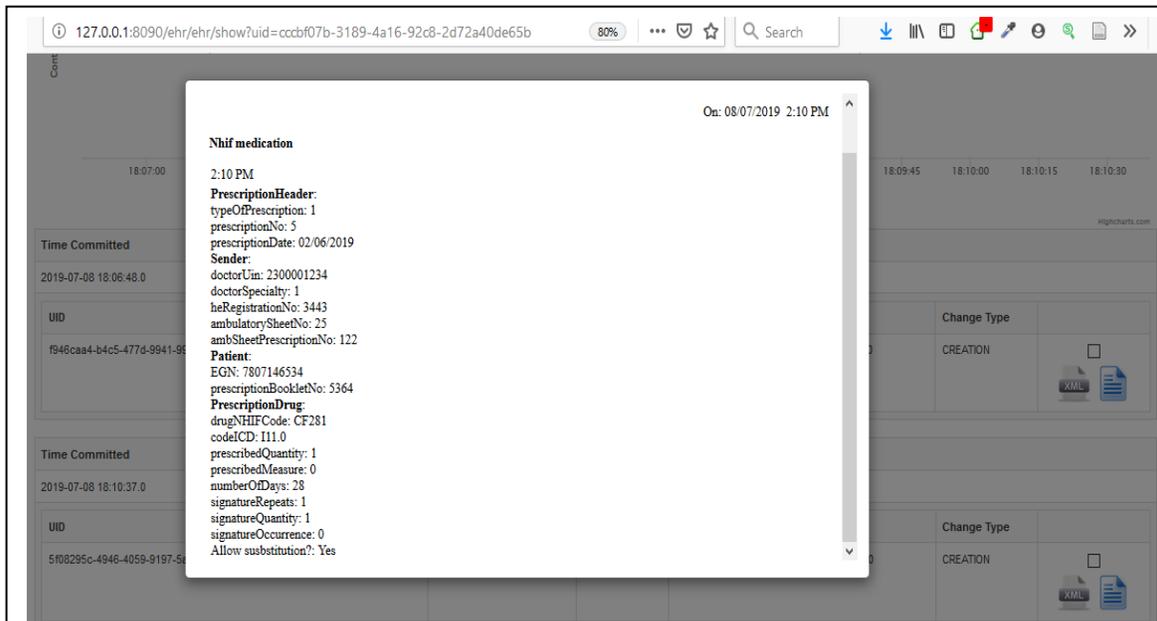


Figure 2. Extraction and visualization of ePrescription data in openEHR server's web console.