An openEHR-Based Clinical Decision Support System: A Case Study

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Abstract. Experiences in developing a Clinical Decision Support System (CDSS) for dry mouth revealed that traditional approaches for creating clinical applications are not suitable because of the lack of structured knowledge in the domain and the complex nature of existing knowledge. Nevertheless, openEHR offers various benefits. This paper presents the issues related to developing an openEHR-based CDSS for this disease.

Keywords. clinical decision support system, openEHR, archetype, dry mouth

Dry mouth is an oral disease that can be a result of other diseases or an adverse effect of previous medications. We have selected dry mouth as our case study for developing a clinical decision support system (CDSS). Two options have been investigated. The more explored solution is to develop a knowledge-based CDSS using traditional approaches and the other one to use the openEHR framework [1]. In traditional approaches, computer scientists extract knowledge based on interviews or studying related materials in the domain. This has been always a bottleneck because of the complex nature of clinical knowledge and the lack of structured information in many cases. Data modelling and storage is done without considering the dynamic nature of it. In case of any future changes in the structure of data, various parts of the application are affected. In the openEHR approach, clinicians are responsible for knowledge extraction and modelling of archetypes that will later be used in archetype-based reasoning. However, we do not need an information model only, presented by archetypes, but also a concept and inference model for reasoning [2]. The interfaces between these three models should also be investigated. Although the archetype concept is complex, it is more understandable for clinicians, since it resembles clinical concepts. Validation of data can be done using archetypes that will lead to high quality EHR storage. The two-level modelling approach in openEHR leads to involving users from an early stage of the project to developing domain knowledge, and independently developing the inference engine, or required interfaces for mapping between models by computer scientists. By having a stable and general-purpose information model, it is possible to develop not only a CDSS but also other visualization and analytical applications needed for improving knowledge.


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