Abstract

A meaningful electronic health record (EHR) improves the ability for healthcare professionals to enact evidence-based knowledge management and aids decision making in health care. EHRs can have a positive impact in quality of care, patient safety, and efficiency. To advance towards those visions, it is imperative to gain the trust of the involved stakeholders, doctors and other medical personnel, patients, families, health care providers and regulators, as well as system developers and IT personnel. Even though one critical requirement is interoperability among the various systems involved, currently existing solutions are still vertical silos to a large extent. OpenEHR is an open specification in health informatics that describes the management, storage, retrieval and exchange of health data in electronic health records. Although it is being set as national standard in some countries, including Brazil, health informatics stakeholders still find a great complexity working with openEHR. The authors of this tutorial are academics and developers that have been teaching and developing worldwide eHealth solutions, leveraging benefits of using this standard. This tutorial will showcase how easily clinical data models can be put in practice making semantic interoperability applications a tangible reality.

Keywords:
Electronic Health Record; openEHR; Clinical Information Systems; EHR.

Tutorial Description

The main motivation for this tutorial is to showcase real world experience in the development of modern web based applications based on open health data using openEHR methodology, tutoring from theory into practice. This tutorial is a good fit for the Medinfo 2015 conference because a) openEHR is an EHR standard adopted by the Brazilian government and by other countries [1], b) it is gaining momentum within the eHealth community because of the dissemination and training activities created by the community [2], c) the clinical concepts used as an example will be from the Brazilian reality, d) it will be one of the first demonstrations or tutorials using the ADL 2.0 openEHR specification tooling, shown by their own developers and e) at some points, depending on the attendees, doubts can be taken in Portuguese.

The use of computerized procedures is a fundamental strategy to allow the accumulation of standardized information continuously and reliably over time and in different locations. Only this way can we perform retrospective and prospective studies based on good data.

In addition, the possibility of linking health information generated in different locations is expected to enable multi-center studies, as well as to achieve interoperability between computer systems. For this, we need to ensure the exchange of information between these systems, keeping its original meaning, and this can be done by explaining and motivating every stakeholder to agree on the use of a standard, being it openEHR, and how to achieve a working system.

The tutorial starts with an introduction to openEHR with highlights on technological aspects of developing standards based open data + open API enabled applications. The chapter is summarized with practical demonstration of openEHR solutions showcasing semantic interoperability.

The main content of the tutorial consists of a hands-on example, using clinical data models, cloud based REST API services and web tools to create web based PHR application. Demonstrating how clinical data models are turned into software artifacts - application, by explaining the experience of EHRscape [3] development and by presenting a few tools and code examples, that will be prepared for the attendees to use during the tutorial.

It will start by choosing a current Brazilian document specification, for example Discharge Note, and assemble a template using available archetypes in international openEHR Clinical Models Repository (CKM). Next the template will be turned into an actionable clinical form combined with REST API calls demonstrating store/retrieve/query electronic health record operations. The demonstration will also show how Clinical Decision Support (CDS) services can be easily integrated within openEHR based systems, and also how stored data can be explored to simplify research, studies and reports. Thus giving a glimpse of all the parts necessary, empowering attendees with a better understanding of the big picture of an openEHR Information System development.

We will end with the conclusions about the different approaches to Clinical Systems design and implementation.

During the tutorial, audience participation and discussion will be encouraged.

Tutorial Structure

This tutorial will be organized by the following structure:
Expected Attendees

Health Professionals, Computer or Informatics Engineers, Information or Computer Scientists, Software Developers, Software Architects, Decision Support Specialists, and Business Intelligence Experts, researchers, students or healthcare informatics enthusiasts.

Tutorial Speakers

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References


Specific Educational Goals

The main goal of this tutorial is to expose an overview on how to implement the openEHR specification using an understandable and more practical approach.

The secondary goals consist of: providing advice on the process of modeling clinical content, displaying the Electronic Health Record architecture based on the model openEHR, enabling the use of modeling tools for archetypes and templates, demonstrate how openEHR approach facilitates new business opportunities for innovation from small, nimble companies, encouraging the participation and contribution of health professionals in the creation and maintenance of archetypes library in Portuguese, encouraging software developers to build openEHR compliant Information Systems and the necessity of standard communication and stimulate integration in the international community.

Expected outcomes

With this tutorial attendees should have a better knowledge of the openEHR specification and implementation, a set of skills to better model clinical concepts into openEHR archetypes, to better design openEHR Information Systems, and supply a set of software pieces that can enable a faster development of a functional apps and EHRs based on openEHR.