Data Exchange Standards for Electronic Medical Records

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ABSTRACT

Electronic Medical Record (EMR) systems can facilitate efficient health care delivery, lower the reporting burden on facilities, and provide a wealth of data for analysis and monitoring purposes. This is particularly true for the chronic care required for such diseases as HIV and TB.

Many countries in both the developing and developed world often have several EMR systems deployed across their jurisdiction, range from several different systems installed within the same health facility, to isolated systems for a single facility to systems which cover multiple facilities across different levels of the national health care system. This often leads to incompatibilities which prevent the efficient use and analysis of data which can be collected across these systems because they do not represent the data in a consistent way.

Promoting and supporting the development and use of simple and open data exchange standards, guidelines for the use of existing terminology and coding sets, and a formal approach for defining a national core dataset can resolve this problem by allowing individual systems to export their data in a consistent way, thus moving towards the goal of having a “single” health information system but which contains the richness and usefulness of individual software systems and platforms adapted to local needs, workflow, and capabilities – designed to serve the needs of patient care first.

Categories and Subject Descriptors

J.3 [Life and Medical Sciences]: Medical Information Systems

General Terms

Management, Design, and Standardization.

Keywords

Data Exchange Standards, Terminology, Coding

1. INTRODUCTION

This paper provides a high level overview of our approach to standards implementation within a country’s health system. It emphasizes support for the existence of multiple different software implementations which are best adapted to the local needs and capabilities of the facilities and communities that they serve. This allows these facilities and communities to have direct use and analysis of their own data while still being able to communicate this data to higher administrative levels using standards for data exchange in effect creating a single data system from heterogeneous software components.

2. THE NATIONAL CORE DATA SET

Data use should drive the information system design. The first step is for the ministry of health (MoH) to determine what information it needs to use at each level of the health system in order to understand population health status and the services they are providing. This will permit personnel at all levels of the health system to plan and manage the health system and monitor performance. Each data element should be clearly defined with complete metadata. International standards are useful in developing this data set.

2.1 Technical Design

Once the data set is defined, the information system can be described. This includes the source, communication, and use of each data element. The information system will include both manual (paper) and electronic components and the interfaces between the paper and electronic systems.

The information system should include data collection and use at all levels of the health system. This starts with the individual person and moves through the community, clinic, hospital, district, and national levels. The information system design will describe the collection, communication, and use of information including information flows to other levels.

Particular attention should be paid to the district level since this is the basic management unit of the health system and is in the best position to translate information into action. Another focus of health information use is at the level of the point of care of the individual. Here, also, there is an opportunity to make best use of information.

The technical description should include data communication standards and security procedures to protect individual patient information.
There will be many different individual computer applications that will make up the entire information system. These perform all of the unique functions necessary in the health information system. The selection of these applications should be based on their ability to perform the function, their ability to incorporate standards, their ease of use, and their flexibility.

3. OPEN STANDARDS
Once the data set has been identified it must be mapped to existing terminology and transport standards to enable intercommunication between various systems. Using open and freely available standards and terminologies such as LOINC and RxNorm allow for a more cost effective implementation within a country and permit any group involved in the engineering of an EMR or reporting system to implement a consistent data import and export capability.

4. USING KNOWLEDGE COMMUNITIES
Free open source software (FOSS) has developed a proven method of organizing communities to solve specific computer problems. FOSS development has as its foundation the free publication of software source code and documentation in order to foster widespread adoption and enhancement. Open source projects develop communities of developers and users who freely share information, each building on the contributions of others. This model provides a robust environment where innovation and adoption flourishes. A similar approach can be used for the mapping and implementation of an MoH’s core data set to existing standards which involves participation from groups and organizations already involved in electronic data collection through EMRs and other systems within that country’s jurisdiction. Individual groups come together and share their specific data models and approaches and map the MoH core data set to their own systems. By collectively going through existing terminology, classification and data exchange standards, consensus can be achieved on precisely which terms and messages will be used in which contexts.

We have shown the benefits of using this model to develop open knowledge communities of software developers and implementers around an open source software project OpenMRS. This software is an EMR that uses the solid foundation of a data model developed by the Regenstrief Institute at Indiana which can implement an arbitrary core data set mapped to existing standard terminologies

5. BIBLIOGRAPHY
The references cited here consist of documents produced by or in collaboration with the World Health Organization and are representative of the approach described in this paper.