A Patient Centered Electronic Health System: An Example for Cyprus

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Abstract. The design and implementation of a healthcare system needs to follow a specific philosophy regarding its operational structure and must be adapted gradually with one step at a time, depending on the level of maturity of a country on certain key issues. An overall recommendations framework will be presented for implementing an Electronic Health System at national level, guided by the Patient Centered Philosophy. Certain prerequisites for implementing such systems are analyzed together with guiding principles for identifying the maturity level of an organization or country. The maturity level analysis for Cyprus is presented and is accompanied by some recommendations that determine the steps needed to prepare the ground for a complete patient centered national healthcare system.

Keywords. Electronic Health Records, patient-centered, maturity level, epSOS interoperability, Cyprus.

Introduction

The essence of healthcare systems is to address the needs and preferences of patients for an appropriate and cost-effective healthcare. The development of a complete healthcare system remains a very challenging problem; the use of technology in the medical field has opened new roads and opportunities especially when it comes to the realization of the eHealth vision and implementing the patient centered philosophy and concepts. This adoption as a nationally standardized and beyond, publicly-reported standard for evaluating the patient experience has made the implementation of a patient centered approach a priority for many healthcare leaders and decision makers. Patient centered was considered a radical philosophy not so long ago. Today patient centered care is a core component of healthcare quality recognized by all stake holders and policy makers. The cornerstone of a patient centered eHealth strategy is the integrated Electronic Health Record (EHR). Many benefits can be attributed to an integrated structured EHR environment such as better management of resources, improved care coordination, chronic disease management, nation and world wide access of medical data and interoperability issues resolved, elimination of medical errors and delays, reduced operational cost and patient involvement in their therapy [1]. Only in the United States, it has been demonstrated that medical errors may be the third leading cause of death [2]. The organization of medical information, the efficiency in the exchange of information and reactivity of caregivers are some of the safety concepts that an EHR system encompasses, hence reducing the medical errors to 3-4% [3]. Further studies in the USA have reported that exploration of Information

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Technology for the facilitation of EHR systems can save in the medical costs up to $88 billion over 10 years [4]. Hospitals with all the automated processes that structure a complete EHR system such as notes and records, order entry, and clinical decision support systems have fewer complications, lower mortality rates, and eventually lower costs [5,6]. The approach that Europe has taken over the last few years and more recently by the announcement under the Horizon 2020 ambitious Work Programme of the challenge titled Health, Demographic Change and Wellbeing, shows the determination of Europe to find solutions, impose policies and standards, to support the eHealth and patient centric philosophy mainly through the implementation of national EHR systems. The overall goal of the 2012-2020 eHealth Action Plan [7] is to improve healthcare for the benefit of patients, give patients more control of their care and bring down costs.

1. Issues to be considered for implementing EHR systems: Maturity Level

A number of EU directives have been published that provide rules for facilitating the access to safe and high-quality cross-border healthcare and promotes cooperation on healthcare between Member States, in full respect of national competencies in organizing and delivering healthcare. Privacy and confidentiality, personal data, and data protection issues are highly relevant when discussing EHR in its local and pan-European legal and regulatory context. It is thus very critical to amend existing health related legislations to create a prosperous ground for accommodating EHR systems.

More importantly, for the proper functioning and exploitation of the EHRs benefits, semantic interoperability of medical information must be established. This requires effective use of common communication protocols and standards to support accurate and complete clinical documentation that allow both humans and computers to understand and utilize accordingly the general medical information [8].

Experience has shown however that one of the most critical factors, if not the most critical, is the political will and determination that governments and other decision makers should take when needed for supporting and encouraging the implementation of eHealth actions. The interests of many associated players, such as medical providers, eHealth experts, pharmaceutical and medical supplies firms, insurance companies, trade unions, employers and employees associations, should not be ignored. Legislation should be based entirely on improved health care for the citizen indiscriminately at the lowest possible cost, irrespective on who is going to pay the bill at the end.

The European Commission recognizes the importance of cross-border healthcare, data protection, public procurement and health security. Experiences so far have shown that researchers and patients have an active interest in technology and its usage; patient safety and data ownership become even more sensitive issues online and it is appreciated by the user. The Commission understands that regional differences must be addressed to avoid Europe becoming a two-tier society where innovation bypasses population groups who may not have the opportunity, inclination or the necessary skills to incorporate the eHealth philosophy, for a number of reasons having to do mainly with geography, education, and demography. It is therefore necessary to identify the maturity level of each country before any attempt is made to introduce an EHR system at national level. The implementation approach should consider this maturity level for minimizing failures and maximizing success. Maturity models were introduced and used in information system development, especially software development. One aspect

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to be determined is the familiarization with eHealth and ICT concepts [9, 10]. Furthermore, issues such as understanding security, privacy, patient rights, prevention, cost estimation, legislation, technology, electronic education, clinical support systems, and semantic interoperability should be properly assessed [15].

2. The example of Cyprus

For investigating the current situation in Cyprus with related to eHealth issues, a survey was conducted, mainly through a questionnaire that has been circulated in the whole island and administered by the Cyprus Medical Association, the Cyprus Society of Medical Informatics and members of our research lab. Some of the most interesting findings of the questionnaire have been presented in a previous work [11]. The main goal of the survey was to study the findings along with recommendations made by the academic community, and try to assess the maturity level of the country for adapting a patient centered national EHR system. In accordance we present here below some recommendations based on the country’s maturity level related to eHealth concepts.

1) Political willingness and determination of the decision makers must be established for adopting the guidelines for medical semantic interoperability recently proposed by the European eHealth Network [12] in line with the European Directive 2011/24/EU. Preliminary work in this direction, and in particular from the European large scale pilot “European Patients’ Smart Open Services” [13], provided a solid and reliable foundation, for utilizing a number of key components and techniques that must be adapted for the future development of any EHR system in Cyprus.

2) ePrescription: The electronic prescribing of medicine by legally authorized health professionals and the electronic dispensing of the medicine to the patient are two additional key concepts that should be considered for the case of Cyprus. Guidelines for the development and adoption of ePrescription have been published by the epSOS project [8]. Cyprus followed the EU recommendation but not yet implemented.

3) For adopting a recommended guideline, certain legislation amendments must be promoted. An established legal framework is a prerequisite for businesses to invest in the development of health related systems, and health providers and users to move forward and use any new products and services. In Cyprus the legislation for accepting EHR has not been enforced and local healthcare providers are required to keep hard copies of medical data even in the cases where an EHR system is in place.

4) As a pilot project, the development of an EHR systems can start based on a free and open source medical practice management application such as OpenEMR (www.open-emr.org), including dcm4chee which can cover an image manager/image archive, such as PACS. Furthermore, specific enablers related to eHealth applications that are offered by the FI-STAR platform [14] could also be exploited as these could benefit and facilitate the whole process.

3. Discussion

In a small country like Cyprus one can see many reasons why Cyprus should seriously invest in the development of the health sector. A country that is visited every year by tourists and business people counting 4-5 times higher than its permanent population should offer interoperability and cross country health services in order to
remain competitive in the international market. The cross country access to the electronic health record of the visitors is the cornerstone of personalized health, which at the same time will provide to the Cypriots travelling abroad, all the associated benefits. In spite of economic austerity measures applied in Cyprus, the opportunities for growth and the opening of new businesses related to health and its technological innovation are tremendous. The Cyprus authorities must take advantage of the country’s small size and seek for participations in eHealth initiatives promoted by the Europe Union for an active and pioneering role. Its small size makes it an ideal place for running many pilot actions for testing the operation and applicability of eHealth at national level. Clearly, a lot of progress still needs to be made before Cyprus can deliver truly personalized or citizen-centric healthcare. The potential to shape new healthcare models is real and if implemented wisely, eHealth solutions can contribute to address many challenges faced by the Cyprus suffering health and economic systems.

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