

Managing Chronic Conditions through Hosted Medical Records in Kenya

Kiura, S. M¹, Waema R. ²

¹Kenya Methodist University, salesio.kiura@kemu.ac.ke

P.O BOX 15991 – 00100 Nairobi, Kenya

² Center for Applied Research in Mathematics (CARMS) Strathmore University)

Abstract:

Complex medical conditions are rising in developing countries at very alarming rates. E.g. projections from the World Health Organization’s global burden of disease and risk factors report chronic diseases are responsible for up to 50% of disease burden in selected countries. Diseases hitherto associated with the developed countries like diabetes, cancer and Hypertension are in the increase in developing countries.

Management of these medical conditions calls for a new way of delivering health care services in these countries. Long term therapeutic management of these diseases requires availability of medical records to a provider when a patient presents him/herself at a medical facility. Advances in technology present opportunities for informing systematic management of these chronic conditions within constraints of resources that these countries face.

Introduction

The global health conditions and associated disease burden in the world has been changing from one dominated by infectious diseases to one characterized by chronic conditions such as hypertension, cancer, diabetes, and chronic respiratory diseases [6, 9]. Whereas these conditions have traditionally been associated with the developed world, the reality is that the developing countries are increasingly faced with these diseases at alarming rates. According to World Health Organization's (WHO) global burden of disease and risk factors report, chronic diseases are responsible for up to 50% of disease burden in selected countries [6]. Moreover, according to [7] 80% of worldwide deaths from chronic conditions occur in low-income and middle-income countries.

With already over stretched budgets of developing countries in addressing primary care needs and infectious diseases, the “new” source of burden calls for a new way of thinking and delivering health care. It is not

only the lack of resources that requires new innovations to deal with these conditions but also the requirements for proper management of such conditions are different from how infectious diseases are managed. One critical aspect is the need for systematic treatment management plans by health care providers. Long term therapeutic management of these diseases requires availability of medical records to a provider when a patient presents him/herself at a medical facility (therapeutic). In this respect, electronic medical records provide opportunities for easy sharing and exchange among service providers. However, the installation of electronic medical records in developing countries is not a priority since there are more pressing needs for *drugs rather than computers*. New way of delivering technology, especially cloud computing, presents opportunities for cost-effective technology support in management of chronic diseases.

Gartner Research defines cloud computing as "a style of computing where massively scalable IT-related capabilities are provided 'as a service' using Internet technologies to multiple external customers." Our take from this for the healthcare industry is that the IT infrastructure used in healthcare needs to be a non intrusive tool that does not come in the way of a provider but rather enables s/he to better deliver the health service. A typical health service providing facility (e.g. public hospital) is faced with challenges of enough medical staff, making it unrealistic to expect full time personnel to manage (on a full time basis) technology related issues at a hospital. Support by technology is expected to cover typical medical records activities of collection, recording, organization, storage, retrieval, transmission, aggregation of epidemiological statistics. Most of these can be "outsourced" to an entity providing software 'as a service'. Carrying out of other tasks (especially recording and retrieval) need to be made easier by use of modern day tools like mobile phones.

Our proposed Technology's Rationale

We believe that the Kenyan health sector is ripe for embracing cloud computing technologies. The sector has in the last five years enjoyed sustained reforms that have among other things defined and developed data capturing tools. The sector has an institutionalized culture of capturing medical information (demographics, vital signs, medication and allergies, immunization status, etc). The challenge is the management and use of the data for decision-making [4, 3]. The next level of the reforms in health management information systems is likely to concern how the Internet will affect both administrative and clinical tasks; how it impacts communication

between and among patients, payers, and providers; and how it can be harnessed into integrated delivery systems [8].

We propose a project that will introduce remotely hosted medical records of patients to enable health service providers make references to a patient's medical history for an informed therapy plan. A hosted service is cheaper than individual installation at clinics. Starting with two regions (Nairobi and Machakos), we shall install a server that will aggregate diabetes and hypertension data from the two regions in ca. 20 hospitals. The records will be searchable provided a valid patient-specific code is entered.

Proposal and addressing Emergent Challenges

Since the time of Hippocrates the need to maintain the confidentiality of medical information has been recognized [2]. A major concern to be addressed involves ensuring integrity of the information practices, especially confidentiality in access and interchange of stored data. In this regard we tap into the privacy of mobile phones whereby access to the system will be tied to a time limited session. To initiate a session, a user will login and upon request to access a medical record of a patient, the system will generate a code sent to the patient's mobile phone number. Access to the code is therefore limited to the patient who must retrieve it from his/her mobile phone.

This is one concern among several that we address as per European privacy association that include Scope(s) of the processing, Information notice and consent, Data security measures (service level agreements), Data subject's rights, Data transfer to third parties (consent clauses), termination / erasure clause [1]. Regional government officials in these regions will only access summaries that will never expose names nor patient identification. Providing views of de-identified patient data in the server for research (and aggregation of epidemiological statistics) purposes makes good sense because the primary will shift to aggregate data analyses of massive numbers of records (e.g. for informing data-driven planning).

In the first 2 months we shall carry out a baseline survey to select participating hospitals and identify the basic parameters for data capture. In the next 3 months version 0 of the system will be operational with basic patient data (bio information, latest vital signs and medical history notes). Updates to these records will be possible via SMS and via authorized email. After a review of the project in the sixth month, we plan to extend it to include hosting of radiology images. Thus acting as a clearing-house of

making reference to radiologists' reports (currently patients undergo radiology exposure very often since no records are available).

Conclusions

We believe that this system will lead to information driven decision making and improve health services delivery in Kenya especially once reproduced / adopted beyond the two regions. A major advantage is the relative low cost of getting started. For less than USD 10,000, the system will reach a catchment area of about six million residents. Targeting the public facilities initially means we shall be covering an area reporting about 30,000 patients' visits per month [5]

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