



Electronic Medical Record Systems for Developing Countries: Review

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Abstract

Countries around the world are in need of electronic medical record (EMR) systems that meet their specific needs. This paper describes briefly the benefits of EMRs in developing countries. It focuses on the basic EMR information, including types of EMRs, components of EMRs, and already existing EMRs, in order to establish which EMR systems would be feasible and effective for specific situations.

Introduction

- Basic paper-based medical record keeping is not sufficient and needs to be replaced by more efficient electronic medical records (EMRs) systems even in developing countries
- In developing countries paper based records must be hand delivered rather than faxed or emailed
- **Benefits of EMRs include:**
 - Improving the legibility of clinical notes
 - Provide decision support for drug ordering
 - Provide reminders to prescribe drugs and administer vaccines
 - Help support program monitoring, including reporting outcomes, budgets, and supplies
 - Help with the management of chronic diseases such as diabetes, hypertension, and heart failure
- **Problems specific to EMRs in developing countries include:**
 - Difficult to establish and maintain
 - Availability of resources including internet and electricity
 - Physicians resist change to medical record systems
 - Allows for the design of a customized medical records system specific to the care provider's needs with no programming knowledge

Open Source Electronic Medical Records

A. Veterans Health Information Systems and Technology Architecture (VistA)

- First open source medical record keeping system which was originally developed and maintained by the U.S. Department of Veterans Affairs
- Many healthcare providers all around the world currently use this software
- A major problem with VistA, however, is that the language used to implement it is the Massachusetts General Hospital Utility Multi-Programming System (MUMPS). MUMPS is not widely used

B. Care2x

- Is web-based and built upon other open-source projects
- Failed to meet this purpose with its lack of structured documentation, unorganized code, and poor naming conventions

C. OpenMRS

- Most recent and promising open source EMR
- Allows for the design of a customized medical records system specific to the care provider's needs with no programming knowledge

Existing EMRs in Developing Countries

Some developing countries are leading the way on EMR adoption with 60% adoption rate in India compared with 9% in the US

A. Mosoriot Medical Record System

- Developed in Kenya in 2001
- Serves 60,000 patients, and runs Microsoft Access on two networked computers
- Patients visits were 22% shorter, provider time per patient was reduced by 58%, patients spent 38% less time waiting in the clinic, clinic personnel spent 50% less time interacting with patients, 67% less time interacting with each other, and more time in personal activities

B. Partners In Health

- Open source web system created in Peru (1996), and serves 4300 patients
- Medication order entry system has shown 17.4% fewer errors than the previous paper approach
- Expanded to Haiti in 1999

Structure of Systems

A. Data Model

- Flat file structures (spread-sheet like) as compared with relational databases

B. Networks

- Stand-alone
- Systems which are deployed on a single machine
- Local area networks
- Wide area network solutions
- Deployed across a much larger area

Discussion

When choosing which electronic medical record system to implement, one should consider the following factors: population, location, and availability of resources.

OpenMRS may be the best choice for today's EMR.

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