EMR Benefits, Challenges and Uses

Benefits

Our work has greatly benefited from using the PIH-EMR: it has simplified many tasks essential to high quality patient care, and has allowed us to perform important research functions regarding MDR-TB and HIV treatment. Some examples of the benefits of using an EMR include the following:

- **An EMR can greatly improve quality of care by keeping patient records up-to-date and easily accessible.** Clinicians can access patient records from various locations, and it is easier to update them electronically than to maintain lengthy paper trails.

- **An EMR allows clinic staff to track patients needing follow-up care.** Follow-up is a major obstacle to care in many HIV treatment programs. Some programs have loss to follow-up rates as high as 24 percent in the first year, while some sites in South Africa lose to follow-up more than 80 percent of children born to HIV-positive mothers. Initial data from PIH sites and other projects in Africa have shown that tracking patients in an EMR can help identify patients lost to follow-up and speed up the process of finding them.

- **The strong search feature allows physicians to find comprehensive patient information.** Clinicians can look up not only medical data, but also whether the patient is receiving non-clinical support, including nutritional supplements or home visits. This ability to track all aspects of patient care provides clinicians with a fuller picture of a patient's health status.

- **An EMR can improve clinicians' ability to help patients manage treatment of complex diseases, including MDR-TB.** Due to long treatment and complex drug regimens, MDR-TB is a difficult disease to monitor. With an EMR, treatment adherence and follow-up, as well as changes in medications and drug forecasting are made possible.

- **An EMR allows clinicians and researchers to analyze data and long-term trends.** Clinic staff can produce analysis for academic use, as well as for internal and external reporting.

Challenges for the implementer

While using an EMR can simplify and improve patient care, there are also several challenges associated with it. Below are some of the challenges we have encountered, and we encourage you to think about them as you contemplate implementation of such a system.

- **Data management/data entry.** Training data clerks and managers is essential to the success of an EMR. See the Personnel section for information about staffing and training.

- **Setting up an Information Technology (IT) system can be expensive.** However, the investment in IT provides benefits beyond the development of a well-designed EMR. Developing and maintaining an IT infrastructure contributes to more effective patient care, overall management and
communication and promotes staff development.

- **Software development and support require long-term resources.** Collaboration with other organizations can be cost effective and increase availability of both financial and intellectual resources.

- **Local buy-in is necessary.** Involvement of local staff in design and testing of systems is key to on-site investment.

- **Perceived lack of benefit for users.** Local clinic staff need to be trained in the use and benefits of the system in order for them to understand the importance of its use, and to participate in implementation.

### Technical challenges

- **Technical support staff is necessary for system upkeep.** IT staff are essential to keep the system running smoothly. [See the Personnel section](http://model.pih.org/book/export/html/531) for information about staffing and training.

- **System security for prevention of viruses and spyware** is vital to the safety and maintenance of the system.

- **A stable power supply and battery back-up is necessary to prevent loss of data.**

### Choosing a system

Both Excel and paper systems have been used in resource-poor settings and have traditionally been successful when patient volume has been low enough to be effectively managed with limited human resources. However, PIH has learned from experience that data needs grow during the course of project implementation, and that patient enrollment often exceeds initial expectations. It is important that a patient monitoring system be built with the capacity for such modifications.

**Paper systems**

In vertical programs such as Directly Observed Therapy (DOTS) treatment for drug-sensitive TB, the demands of the paper record system have been simplified by the standardization of medication, laboratory tests, and reporting. For treatment of complex diseases and longer lasting diseases, such as drug-resistant TB or HIV, simple paper-based approaches do not provide enough flexibility to properly manage disease treatment. While paper systems can likely be improved, there is little evidence to date that they alone can address all the problems identified.

**Excel systems**

A well designed Excel system can hold and organize data for a limited number of patients (usually less than 100) requiring straightforward treatment protocols. However, much like paper systems, using Excel
to track patients has major limitations, particularly when dealing with complex diseases such as MDR-TB or HIV. These include:

- Control over the user interface, patient history or multiple data sets are severely limited.
- When data is entered into Excel, previous data points can be erased. Important patient history can be inadvertently lost while using Excel, as there are no controls on editing data.
- Excel allows users to create unlimited spreadsheets but cannot easily merge those spreadsheets. Merging different spreadsheets can be very important when analyzing complex data over long periods of time. The database behind an EMR allows the user to combine several spreadsheets and operates with a simple user interface.

**Uses of the PIH-EMR**

PIH uses the three systems we have developed for four main areas. They are:

- Clinical care support
- Reporting/Analysis
- Laboratory data management
- Stock management

**Clinical care support**

*The PIH-EMR systems allow doctors to provide better clinical care for patients by giving the doctors easy access to all patient records.* Because patient records are all stored in the database, doctors have instant access to information regarding patients’ clinical status. This is particularly useful when a patient is seen in multiple locations; a physician at a district hospital can see patient history pertaining to visits to the local health clinic.

*The PIH-EMR systems also provide decision support to inform work flow for individual patients.* Our EMR can be used to quickly evaluate individual patient records and determine whether the patient needs additional clinical attention.

*Custom reports can be created to show whether patient data are missing or duplicated.* By alerting clinic staff to missing data, custom reports help ensure that all relevant information regarding patients’ diagnoses and treatments are entered into the system. This aids quality and completeness of care.

**Reporting and analysis**

*The PIH-EMR systems provide data to program staff for reports to collaborators, funders, and internal administrators.* Both external and internal reporting are extremely important to the success of all PIH projects; the EMR provides us the ability to generate them quickly and accurately. *Maintaining confidentiality* in reporting is essential.
A monthly report from PIH Lesotho using OpenMRS

The systems also provide data for research investigation. The system allows researchers to export data in standard formats, such as CSV; they can then perform analysis using common statistical software packages, such as SAS or STATA.

PIH recommends implementing a system in which local staff can analyze the data for internal use.
However, programs more familiar to people working in developing countries such as MS Access and Epi-Info often do not have protections in place that would prevent data from being changed inadvertently during analysis. In the PIH-EMR, staff can edit data, but they must follow a specific web-based menu in order to do so. This ability helps with an analysis function which allows local staff to analyze data without concern for inadvertent data changes in the process.

**Laboratory data management**

*Electronically transmitted laboratory results allow for simple communication between laboratories and clinics.* The ability to send key laboratory data over a web-based system can significantly reduce delays in diagnosis and treatment. Electronic mail, while viable in small volumes, is severely limited as a method of data transfer, as it lacks both organization and appropriate levels of security.

**Pharmacy stock management system**

Managing medication supplies is particularly difficult—and important—in resource-poor settings. This is due to several factors, including poor roads making transport difficult, complicated import policies, and lack of good tracking systems. While it cannot remove all barriers to effective pharmacy management, the PIH-EMR systems allow staff to monitor drug and medical supply in order to prevent stock-outs, request drugs, and track shipments.

The PIH web-based stock management system supporting our clinics is modeled after standardized WHO stock cards (See the Procurement section for more details). Use of the system over the last 2 years has increased rapidly and we now track 450 products, supporting more than 1.7 million patient visits annually. Medication stock-outs have been cut in half and 97 percent of stock requests delivered were shipped within 1 day in the last year.

![Stock levels of HIV drugs at clinic sites in Zanmi Lasante, Haiti](http://model.pih.org/book/export/html/531)