Implementing an Electronic Medical Record System in a Rural HIV Clinic in Uganda

Nicholas Musinguzi[1], Elvin H. Geng[2], David R. Bangsberg[3], Nneka I. Emenyonu[3], Bosco Mwebesa Bwana[1], Isaac Kigozi[1], Winnie Muyindike[1] and Jeffrey N. Martin[2]

[1] Immune Suppression Syndrome Clinic, Mbarara University of Science and Technology, Republic of Uganda; [2]University of California, San Francisco, San Francisco CA and [3]MGH/Harvard Medical School, Cambridge, MA

Introduction

• Over 3 million HIV-infected persons have started on antiretroviral therapy in Africa, representing a 20-fold increase in 5 years. Information management must keep pace with this increase to support clinical and research functions. The Immune Suppression Syndrome Clinic, based in Mbarara, Uganda, was founded in 1998, and by the end of 2008 had an enrolment of 15,875 HIV-infected patients. Here we describe the clinic's evolution of information management during this period of rapid growth.

Methods

• Description of the clinic growth, information management needs systems development and evolution of the function of information management to support clinical, reporting, and research activities.

Results

• From 1998 to 2004 the clinic enrolled an average of 56 patients a month and data was collected in free text on paper charts.

• In 2005-2006 the clinic entered a phase of rapid growth with an average of 273 patients enrolled monthly. At this time an MS Access database was created to handle clinical information which was collected on a structured encounter form. One data manager and two data clerks were hired, entry was prospective and quality control measures were put in place.

• As growth continued during 2007-2008, the size of the database grew to over 150,000 encounters and outstripped the capacity of MS Access. An Open MRS was implemented by the data manager with supported initially with support from WHO-Makerere.

• The clinic database currently support clinical activates but providing easy access to clinical information available to clinicians in real time, producing clinical summary sheets, patient scheduling and other functions. The database supported monitoring and evaluation procedures by reporting on achievement of clinical benchmarks.

• Prospective QA activities include weekly sampling of charts as well as interrogation of the database.

• Data clerks work closely with clinicians and receive ongoing training on the meaning and interpretation of clinical information.

Time interval	Number of patients (cumulative)	Average Enrolment per month	Number of encounters (cumulative)	Entry personnel : data manager	Encounter forms	Database	Median time from encounter to entry (days)	Quality assurance	Information use
1998-2004	4,316	56	52,036	None	Free form, paper-based (figure1)	None	462	None	None
2005-2006	10,875	273	119,689	2:1	Structured, free text, paper based (figure2)	MS Access	6	Prospective sampling of entered data for accuracy Weekly quality assurance meetings	Stakeholder quarterly reports
2007-2008	15,875	185	150,225	7:1	Coded, paper-based (figure3)	Mysql and InfoPath (www.openmrs.org)	1	Prospective sampling of entered data for accuracy Presentation of data collection completeness to providers; Weekly quality assurance meetings	Stakeholder quarterly reports Summary sheet for clinicians Provision of research datasets for international ARTLINC and IeDEA consortia

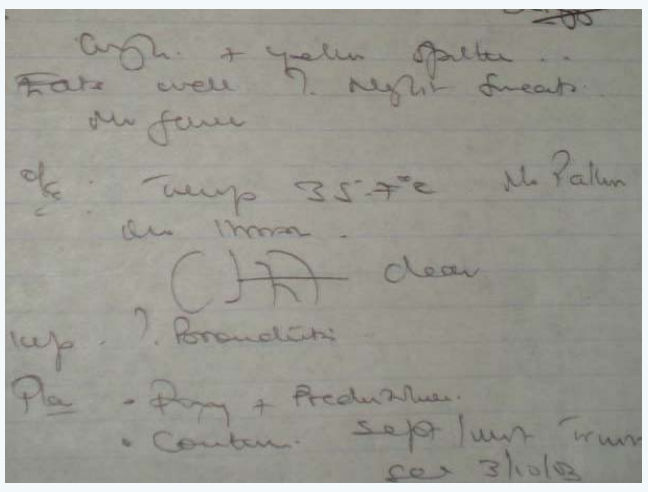


Figure 1

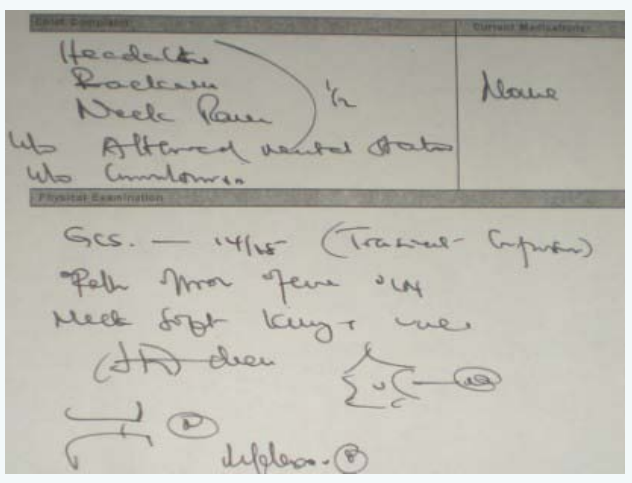
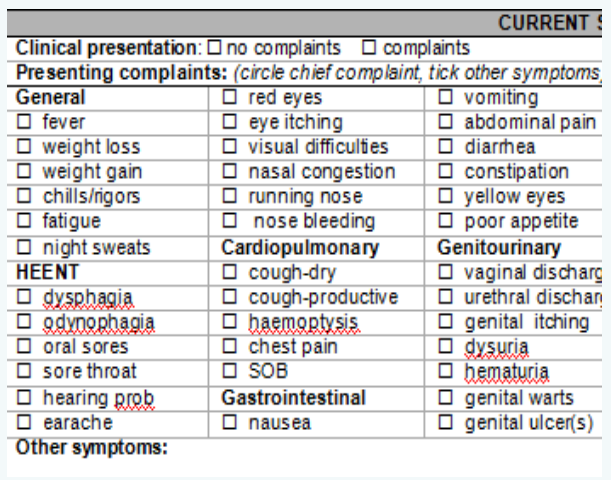


Figure 2



CURRENT S		
Clinical presentation: ☐ no complaints ☐ complaints		
Presenting complaints: *(circle chief complaint, tick other symptoms)*		
General	☐ red eyes	☐ vomiting
☐ fever	☐ eye itching	☐ abdominal pain
☐ weight loss	☐ visual difficulties	☐ diarrhea
☐ weight gain	☐ nasal congestion	☐ constipation
☐ chills/rigors	☐ running nose	☐ yellow eyes
☐ fatigue	☐ nose bleeding	☐ poor appetite
☐ night sweats	**Cardiopulmonary**	**Genitourinary**
HEENT	☐ cough-dry	☐ vaginal discharg
☐ dysphagia	☐ cough-productive	☐ urethral dischar
☐ odynophagia	☐ haemoptysis	☐ genital itching
☐ oral sores	☐ chest pain	☐ dysuria
☐ sore throat	☐ SOB	☐ hematuria
☐ hearing prob	**Gastrointestinal**	☐ genital warts
☐ earache	☐ nausea	☐ genital ulcer(s)
Other symptoms:		

Figure 3

Conclusions

• Information management in rural Africa can successfully be scaled to meet clinical and research activities of a rapidly growing HIV treatment program. Form design influences the quality of data collected. We believe 1 data entry clerk per 1000 patient is sufficient to capture and assure data quality. Dynamic interaction between information management services and providers can enhance the quality and completeness of data. Ability of the data management team to understand the information being collected also improves quality of entry.

Contact:
Name: Nicholas Musinguzi
Address:10-24 Lower Circular Road, Mbarara, Uganda
Phone: +256-712-186-261
Email:nmusinguzi@gmail.com