

The AMPATH Medical Record System

Guðrún Þorsteinsdóttir



Agenda



HIV/Aids care in Western Kenya



Background



Shift from paper-based record to electronic medical record



AMPATH today



Discussion

HIV/AIDS care in Western Kenya



36.9 MILLION
people worldwide are currently living
with HIV/AIDS.

1.8 MILLION CHILDREN

worldwide are living
with HIV. Most of these
children were infected
by their HIV-positive
mothers during
pregnancy,
childbirth or
breastfeeding.



- 25 million (**63%**) in sub-Saharan Africa
- Where only 1 million (<10%) of those eligible for antiretroviral drugs (ARVs) are receiving them
- In response to this epidemic the AMPATH system was created in 2001

Background

- Indiana University, Moi University, and Moi Teaching and Referral Hospital created AMPATH in respond to the HIV/AIDS crisis in Kenya
- Academic Model for the Prevention And Treatment of HIV/AIDS: AMPATH
- Technology & specifically electronic medical records play a crucial role in **expanding access, improving quality and outcome of care, reducing the cost of care**
- Another objective of the care program: **train multidisciplinary providers of HIV/AIDS care**









Towards the #1 medical center in Kenya with Mosoriot Medical Record System

- Modules for patient registry, clinical data, reports, and a concept dictionary defining data elements.
- The dictionary included
 - Term names,
 - Synonyms (to ease data entry)
 - Term classes (to aid reporting),
 - Charges for drugs and tests
- Programmed in MS-Access as a set of spreadsheets for
 - clinical observations
 - laboratory tests
 - And drugs
- Data were entered using checkboxes, dropdown menus, or partial name lookup of dictionary terms
- The MMRS allowed nurses to identify hidden problems such as village with **few vaccinations** and **rabies cluster**

10. Current WHO Stage: <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 Criteria:		New Stage? <input type="checkbox"/> Yes <input type="checkbox"/> No			
Test	Result	Test Date	Test	Result	Test Date
WBC/mm ³			CD4		
MCV			CD8		
Platelets/mm ³			CD4%		
SGPT			CD8%		
Creat mmol/L			Other		
CXR Code			Codes: Greenish	Yellowish	Green/Carbonyl
			2-HR Eruption	4-HR Eruption	7-HR Eruption
			5-HR Cavity	6-HR Cavity	7-HR Cavity

12. Impression: New Problems
 "Add" to add a problem to summary sheet. "Remove" to delete problem from summary sheet
 Problem Code Add Remove Problem Code Add Remove

13. Plan:
 ARVs: None Start ARVs Continue Regimen Change Formulation Change Regimen Stop All
 Reason to start ARVs: Treatment Total pMTCT
 Reason for change: Failure Toxicity Completed T-pMTCT Other
 If start or change: No new regimen
 Combination: Combivir Trizome-30 Trizome-40
 Individual: 3TC d4T-30 d4T-40 dAZT dABC dDDI-125 dDDI-200 dTDF
 dGEP dNVP dKaletra (Lopinavir/Ritonavir)
 PCP Prophylaxis: None Start Continue Regimen Change Regimen Stop
 Reason to start: Failure Toxicity Completed Other
 Reason for stop/change: Completed Toxicity Active TB Other
 TB Prophylaxis: None Start INH Continue INH Stop INH
 Reason for stop/change: Completed Toxicity Active TB Other
 TB Treatment: None Start Induction Change to Continuation Continue Regimen Stop

Paper

10. Current WHO Stage: <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 Criteria:		New Stage? <input type="checkbox"/> Yes <input type="checkbox"/> No			
Test	Result	Test Date	Test	Result	Test Date
WBC/mm ³			CD4		
High g/dL			CD8		
MCV			CD4%		
Platelets/mm ³			CD8%		
ALC/mm ³			Other	Select... <input checked="" type="checkbox"/>	
SGPT					
Creat mmol/L					
CXR Code	Select... <input type="checkbox"/>		Codes: General	3 = Miliary	6 = Carbonyl
			2 = Infiltrate	4 = Difuse infiltrate	7 = Other
			5 = Cavity	6 = Cavity	7 = Cavity

12. Impression: New Problems
 "Add New Problem" to add a problem to summary sheet. "Remove Problem" to delete problem from summary sheet.
 Add New Problem Remove Problem From List

Problems Added:
 1. ANEMIA Delete

Problems Resolved:

13. Plan:

ARVs: None Start ARVs Continue Regimen Change Formulation Change Regimen Stop All
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Computer



- 1-page encounter form – Entered into a computer

Paper Summary

AMPATH Medical Record System Clinical Summary																																		
 																																		
<p>year-old female First Encounter on [REDACTED] WHO STAGE IV Perfect HIV Rx Adherence (past year): yes</p>																																		
<p><u>Problem List:</u></p> <ul style="list-style-type: none">1. DYSPEPSIA (20-Dec-2006)2. DEPRESSION (05-Nov-2006)3. PEPTIC ULCER (05-Nov-2006)4. ANEMIA (01-Nov-2006)5. DYSPHAGIA (21-Aug-2006)		<p><u>Recent ARVs and OI Meds:</u></p> <ul style="list-style-type: none">1. NEVIRAPINE2. d4T-303. LAMIVUDINE																																
<p><u>Flowsheet:</u></p> <table border="1"><thead><tr><th>WEIGHT (KG)</th><th>HGB</th><th>CD4</th><th>VIRAL LOAD</th><th>SGPT</th></tr></thead><tbody><tr><td>59.0 09-Apr-2003</td><td>9.3 09-Apr-2003</td><td>354.0 21-May-2003</td><td></td><td>4.0 09-Apr-2003</td></tr><tr><td>56.0 14-Nov-2006</td><td>13.8 03-Jul-2006</td><td>408.0 03-Jun-2006</td><td></td><td>10.0 03-Jun-2006</td></tr><tr><td>58.0 20-Nov-2006</td><td>9.2 09-Oct-2006</td><td>408.0 01-Mar-2006</td><td></td><td>25.8 09-Oct-2006</td></tr><tr><td>56.0 20-Oct-2006</td><td>7.1 13-Oct-2006</td><td>295.0 (9.0%) 07-Jun-2006</td><td></td><td>25.8 09-Oct-2006</td></tr><tr><td>56.0 08-Jan-2007</td><td>9.7 06-Jan-2007</td><td>292.0 (22.0%) 14-Sep-2006</td><td></td><td>57.2 08-Jan-2007</td></tr></tbody></table>					WEIGHT (KG)	HGB	CD4	VIRAL LOAD	SGPT	59.0 09-Apr-2003	9.3 09-Apr-2003	354.0 21-May-2003		4.0 09-Apr-2003	56.0 14-Nov-2006	13.8 03-Jul-2006	408.0 03-Jun-2006		10.0 03-Jun-2006	58.0 20-Nov-2006	9.2 09-Oct-2006	408.0 01-Mar-2006		25.8 09-Oct-2006	56.0 20-Oct-2006	7.1 13-Oct-2006	295.0 (9.0%) 07-Jun-2006		25.8 09-Oct-2006	56.0 08-Jan-2007	9.7 06-Jan-2007	292.0 (22.0%) 14-Sep-2006		57.2 08-Jan-2007
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<p><u>Chest X-ray</u> 12-Oct-2006: NORMAL</p>																																		
<hr/> <p><u>Reminders</u> CD4 count should be checked every six (6) months</p>																																		
<p>Printed on 2007-04-15 at 23:01:55</p> 																																		

AMPATH Medical Record System (AMRS)

- The AMPATH system was created in **2001**
 - Due to a need for more data and reports
- Four detailed encounter forms for initial and return visits for adult and pediatric patients
- The form captured: demographics, HIV risks, symptoms, medications ...
 - Designed by AMPATH clinicians to serve their needs
 - Similar to the MMRS due to lack of electricity and computers
- Once the number of patients exceeded 10,000 and visits topped 100,000, the system **bogged down**.
- MS-Access AMRS became huge, unwieldy, and limiting due to the big amount of data

Moseriot HIV Clinic - [frmHIVEncounter]

File Edit Insert Records Window Help

ID: [REDACTED]
Date of encounter: 3/11/2002 Time: 8:17 AM Back

General Exam | Neurologic | Psychiatric | Problems | Drugs | J...
Registration Initial Visit Chief Complaint ROS Vitals HEENT Chest Heart

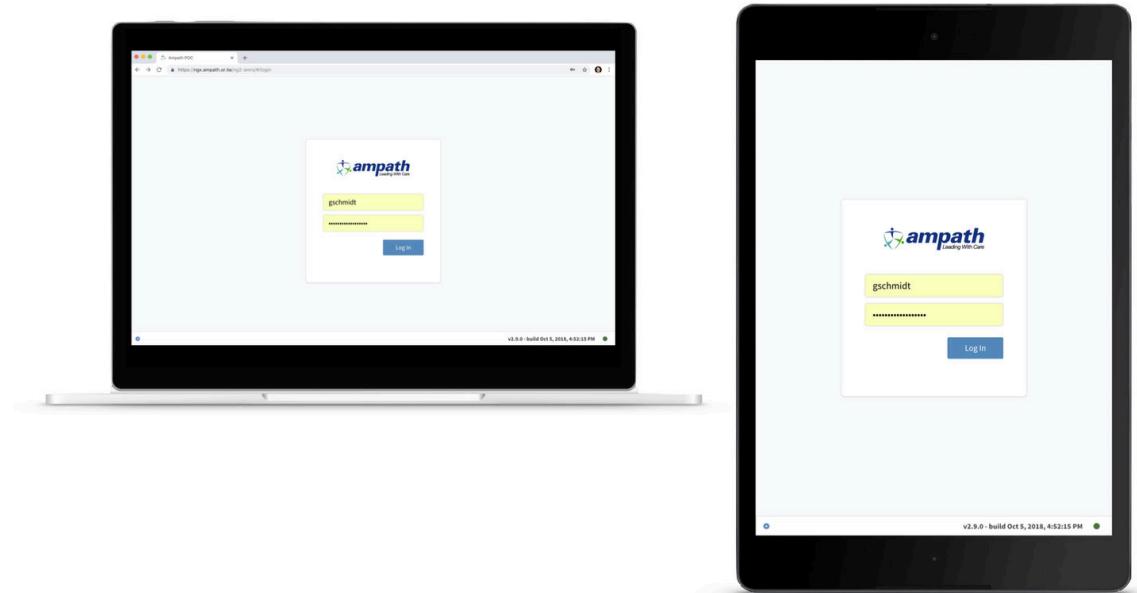
Married Number of wives: [REDACTED]
 Spouse dead
 Suspicion of HIV as cause of death
 Sexual partner or co-wife suspected to have HIV or have died of HIV
 Spouse(s) aware of patient's HIV status
 Patient aware of spouse's HIV status
Sex partners outside marriage
casually active in the last 6 months Number of different partners: [REDACTED]
ways using condoms
on HIV therapy
Children: [REDACTED]
Old: [REDACTED]

Transforming AMRS to more scalable EMR

- To deal with these limitations
- Written in MySQL
- Includes the following components
 - Encounter forms
 - Patient registry: who is providing care, patients numbers, can have multiple names and AMPATH numbers
 - User registry: defines the person who records the data
 - Concept dictionary: terms (diagnosis), findings (infiltrate)
 - Encounter site database: where care is provided
 - Observation database: stores what happens and the most important component
 - Data lookup: clinicians look up data on individuals for decision making
 - Data entry: official medical chart
- The system generates a AMRS report that contains diagnosis, HIV stage etc.
- Limited electricity and Internet access in urban and rural settings.
 - Completed encounter forms are carried by courier to AMPATH's data center where clerks enter data into the AMRS

What has changed?

- By 2015 technology had improved
 - Tablets and mobiles more affordable
- Solar panels to provide power and 4G Safaricom cellular were installed
 - Making it feasible to build a real time point-of-care system
- Today the system is being converted to a point of care real time system
- 8 million visits have been recorded



10 Oct 2018

Figure: Demo of AMRS POC

 **ampath**

Patient requires viral load. Patients on ART > 1 year require a viral load test every year. Last viral load: 166 on (04-05-2017) 17 months ago.

HIV Summary

HIV Summary Historical HIV Summary Medication Change History HIV Clinical Summary Previous Visit Summary

Last Appt Date: 03-10-2018 (ADULTRETURN)

RTC Date: 31-10-2018

Last Viral Load: 166 (04-05-2017)

Last CD4 Count: 487 (14-11-2012)

Current ARV Regimen: LAMIVUDINE, NEVIRAPINE, ZIDOVUDINE

Current ARV Regimen Start Date: 14-07-2015

Enrollment Date: 22-08-2006

ARV Initiation Start Date: 18-10-2006

INH Prophylaxis Start Date : 26-01-2016

INH Prophylaxis End Date : Not completed

Current WHO Stage: 2

TB Treatment Start Date:

Viral Load Reminder

Patient requires viral load.
Patients on ART > 1 year require a viral load test every year. Last viral load: 166 on (04-05-2017) 17 months ago.

ampath

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HIV Summary

HIV Summary Historical HIV Summary Medication Change History HIV Clinical Summary Previous Visit Summary

Encounter Date	Encounter Type	TB		TB		CD4 Count	Vi
		RTC Date	Treatment Start Date	Treatment End Date	ARV Meds		
03-10-2018	ADULTRETURN	31-10-2018		LAMIVUDINE, NEVIRAPINE, ZIDOVUDINE	487 16		
03-10-2018	HIVTRIAGE			LAMIVUDINE, NEVIRAPINE, ZIDOVUDINE	487 16		
05-09-2018	ADULTRETURN	03-10-2018		LAMIVUDINE, NEVIRAPINE, ZIDOVUDINE	487 16		
05-09-2018	HIVTRIAGE			LAMIVUDINE, NEVIRAPINE, ZIDOVUDINE	487 16		
08-08-2018	ADULTRETURN	05-09-2018		LAMIVUDINE, NEVIRAPINE, ZIDOVUDINE	487 16		
08-08-2018	HIVTRIAGE			LAMIVUDINE, NEVIRAPINE, ZIDOVUDINE	487 16		
11-07-2018	ADULTRETURN	08-08-2018		LAMIVUDINE, NEVIRAPINE, ZIDOVUDINE	487 16		

Viral Load Reminder

Patient requires viral load.
Patients on ART > 1 year require a viral load test every year. Last viral load: 166 on (04-05-2017) 17 months ago.

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The screenshot shows a digital health platform interface. At the top, there is a navigation bar with icons for search, users, and grids, and a user profile for 'gschmidt'. Below the header, a message box displays a reminder: 'Patient requires viral load. Patients on ART > 1 year require a viral load test every year. Last viral load: 166 on (04-05-2017) 17 months ago.'

The main content area is titled 'Patient Care Program Snapshots' and features a section for 'STANDARD HIV TREATMENT (Enrolled on 21-02-2018)'. This section includes details about the last encounter: Location: Port Victoria, Date: 03-10-2018, Type: ADULTRETURN, ARV Regimen: LAMIVUDINE, NEVIRAPINE, ZIDOVUDINE, Last Viral Load: 166 (04-05-2017), RTC Date: 31-10-2018, and Care Status: Continue With Care. There are two buttons at the bottom of this section: 'Go to Program' and 'Program Visit'.

Below this, there is a section titled 'Enroll Patient To Program' with a 'Department' field. A red callout box titled 'Viral Load Reminder' provides the same information as the message at the top of the page: 'Patient requires viral load. Patients on ART > 1 year require a viral load test every year. Last viral load: 166 on (04-05-2017) 17 months ago.'

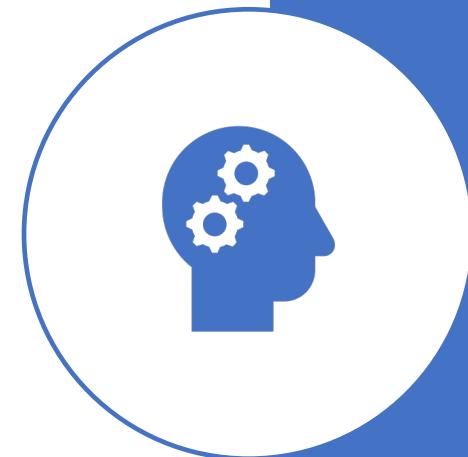
10 Oct 2018





Discussion

- Q1: Do you have any ideas what possible next steps/new functionalities for the future of AMRS could be?
 - “We can harness the benefits of machine learning to help make care more accessible, higher quality, and lower cost”
 - Full order entry of medications and integration into the pharmacy
 - Telehealth capabilities, to help keep patients close to home
 - Integrate more diagnostic tools and labs
- Q2: Do you think that with implementation worldwide of electronic medical record such as AMRS that we could lower the HIV/AIDS numbers extensively over the coming years?



References

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