

GLOBAL COMMUNITIES BUILDING FREE HEALTH IT PLATFORMS



OpenMRS
MEDICAL RECORD SYSTEM

MICHAEL DOWNEY – HAMISH FRASER
LIBREPLANET 2013

“*We are now faced with the fact, my friends, that **TOMORROW IS TODAY.***

*We are confronted with the **FIERCE URGENCY OF NOW.***

*In this unfolding conundrum of life and history,
there is such a thing as **BEING TOO LATE.***

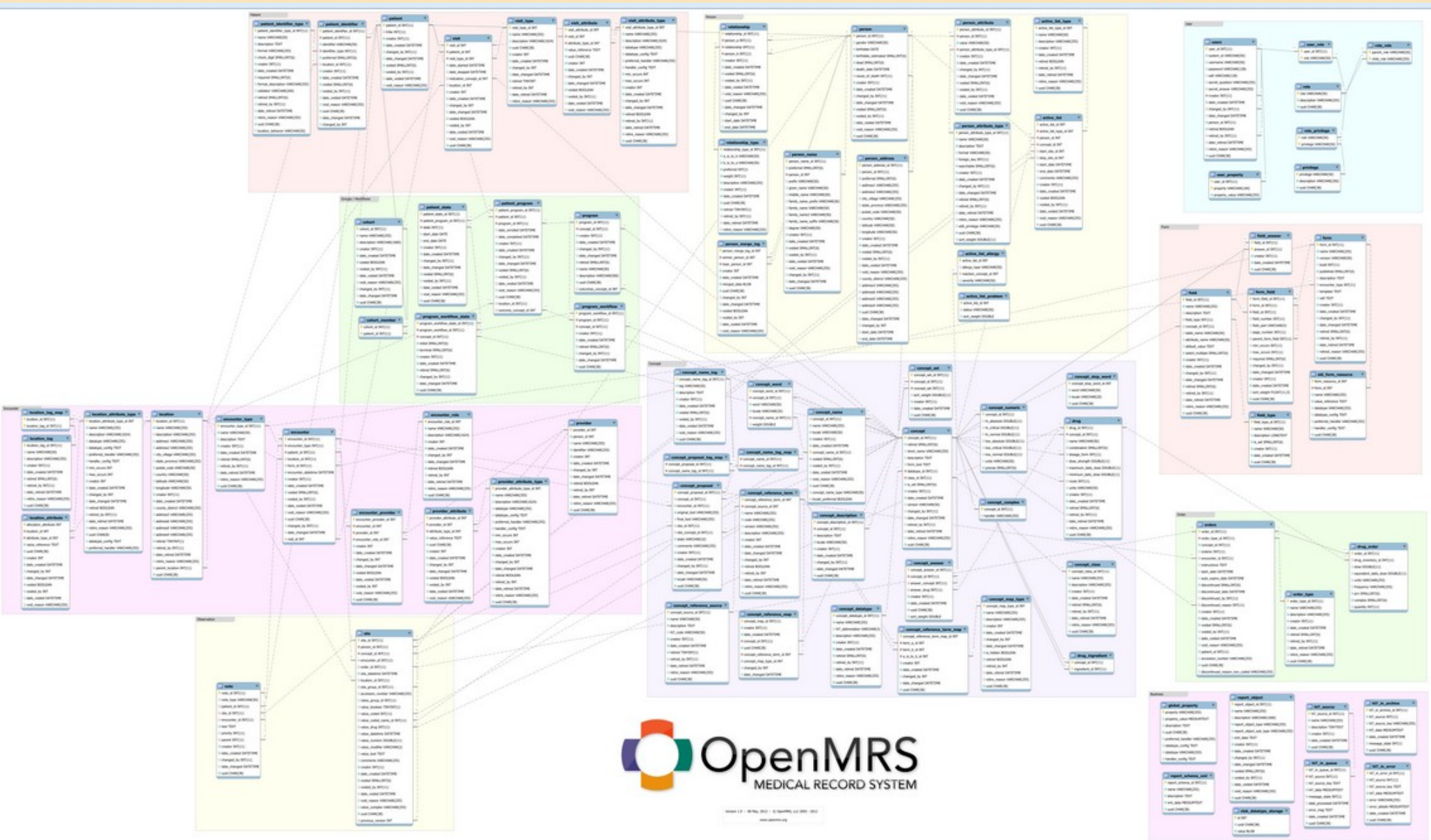
***PROCRASTINATION** is still the thief of time.”*

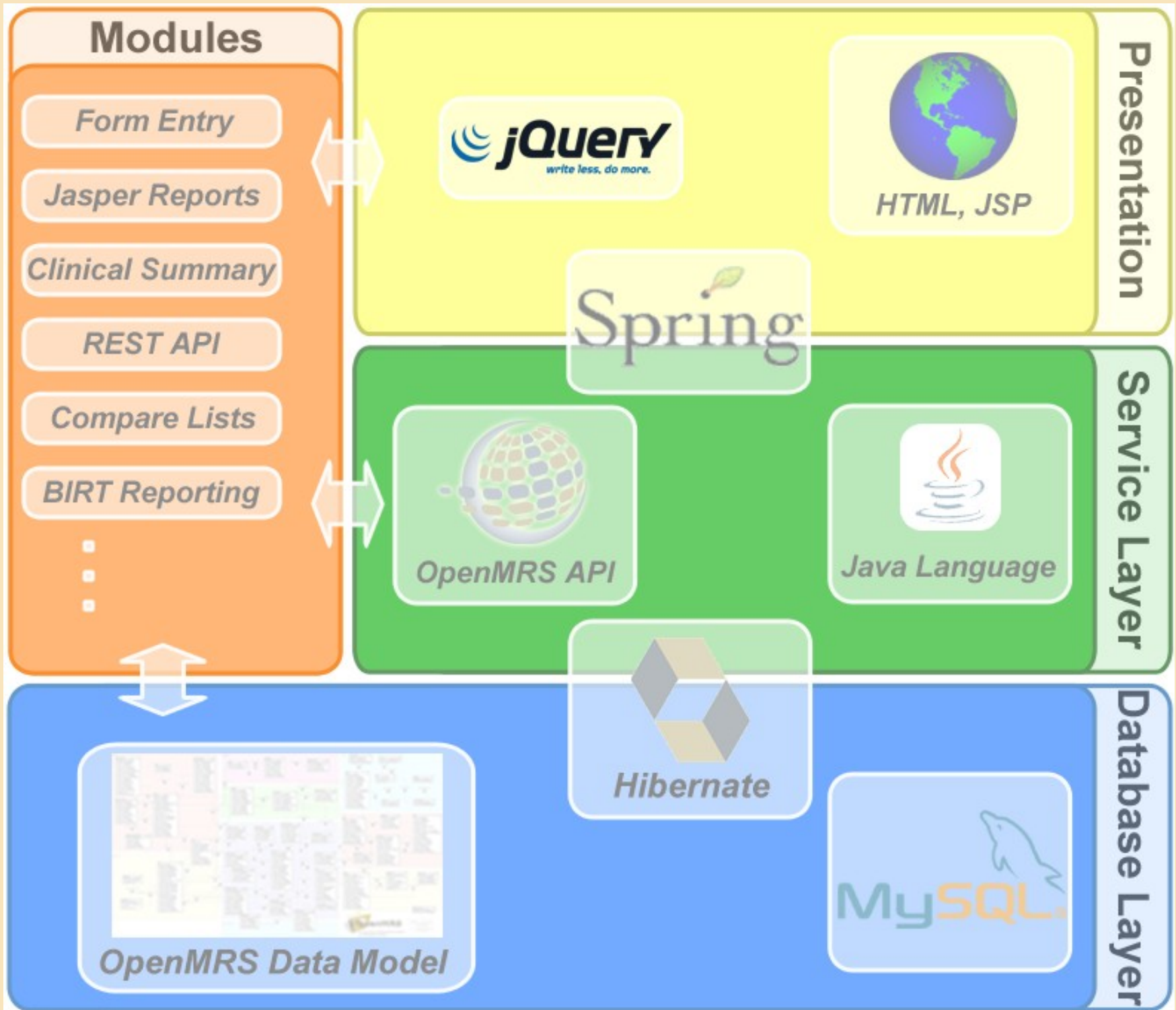
MARTIN LUTHER KING, JR.

VIRAL ENTREPRENEURSHIP:

HEALTH IT PLATFORMS CREATE GLOBAL SYNERGY.

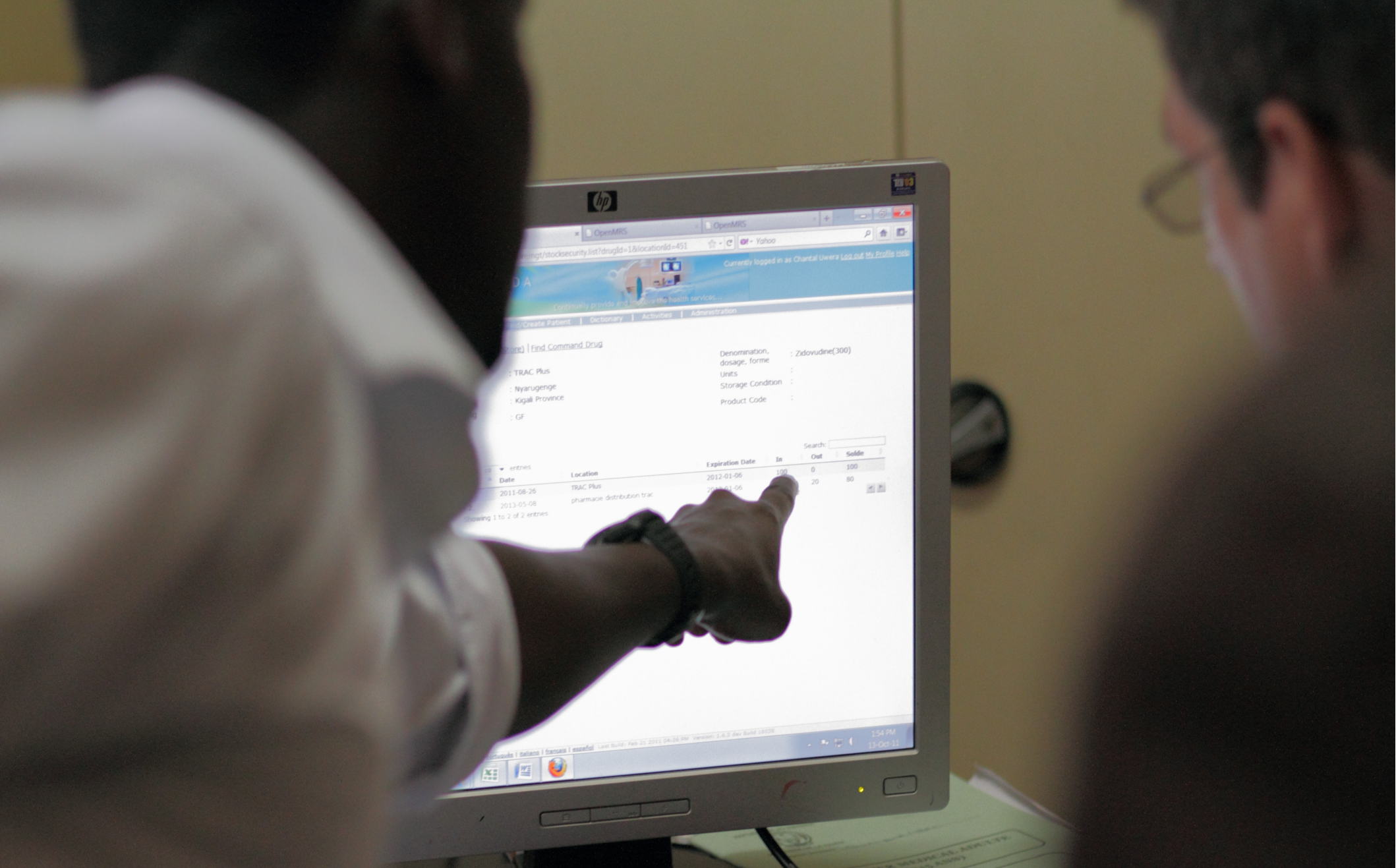








BUILDING WITH OTHERS



INTERNATIONAL COLLABORATION

MAJOR PARTNERSHIPS...

ROCKEFELLER FOUNDATION

INTERNATIONAL DEVELOPMENT RESEARCH CENTRE (CANADA)

WORLD HEALTH ORGANIZATION

US AGENCY FOR INTERNATIONAL DEVELOPMENT

US CENTERS FOR DISEASE CONTROL (CDC)

NATIONAL INSTITUTES OF HEALTH

DOCTORS WITHOUT BORDERS

THOUGHTWORKS

GOOGLE

MERCK



...INDIVIDUAL RELATIONSHIPS.





INFORMATION IS CARE

WHY USE AN EMR?

- Clinical care and quality improvement
- Reporting to clinicians, managers, funders
- Logistics and supply chain management
- Clinical research



A NATIONAL & GLOBAL CRISIS







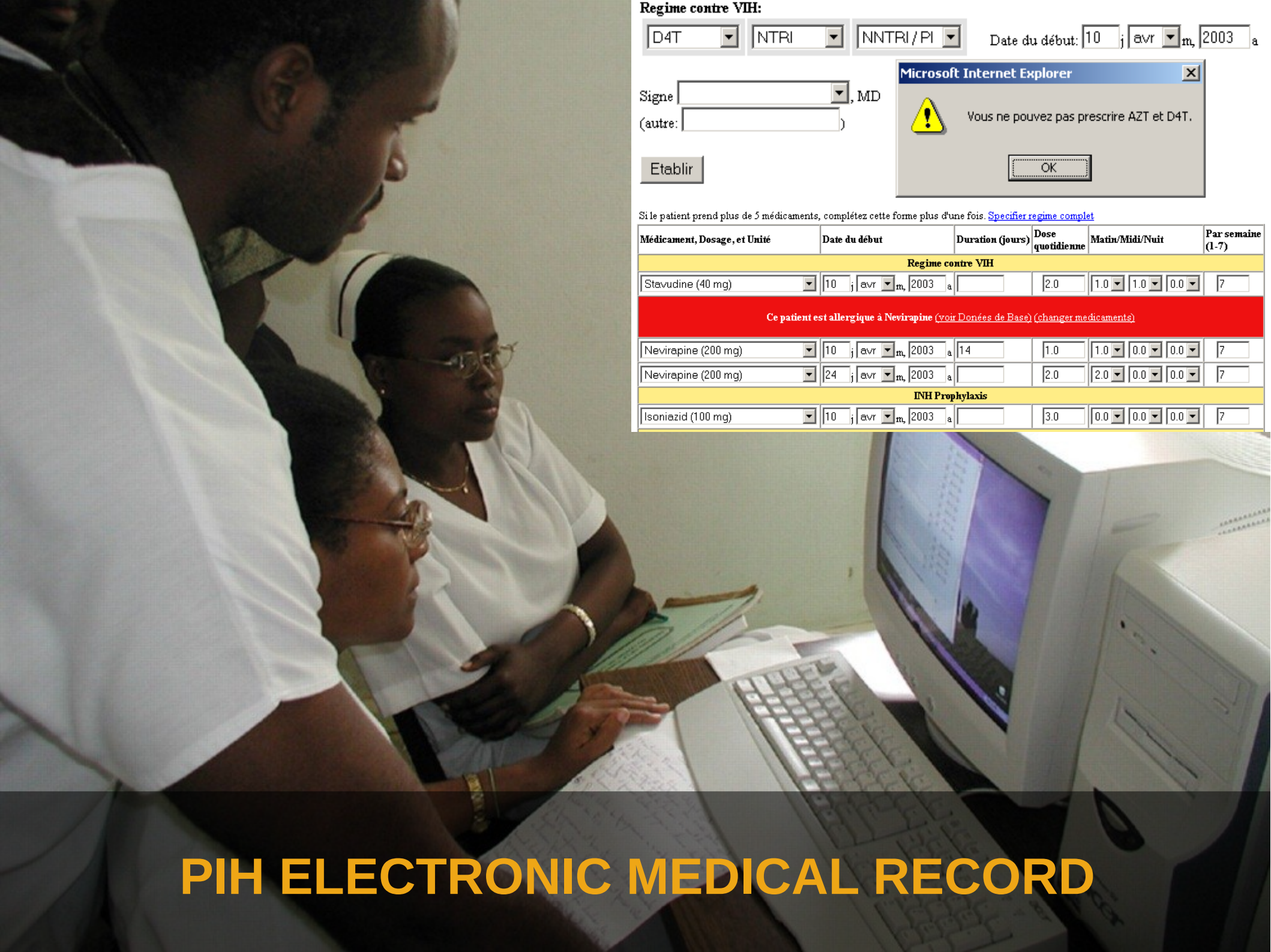
Partners
In Health



INDIANA UNIVERSITY

FROM TWO PARTNERS TO ONE COMMUNITY.

2004: INDIANA UNIVERSITY & PARTNERS IN HEALTH




Regime contre VIH:

D4T NTRI NNTRI / PI Date du début: 10 j avr m, 2003 a

Signe , MD
(autre:)

Etablir

Microsoft Internet Explorer

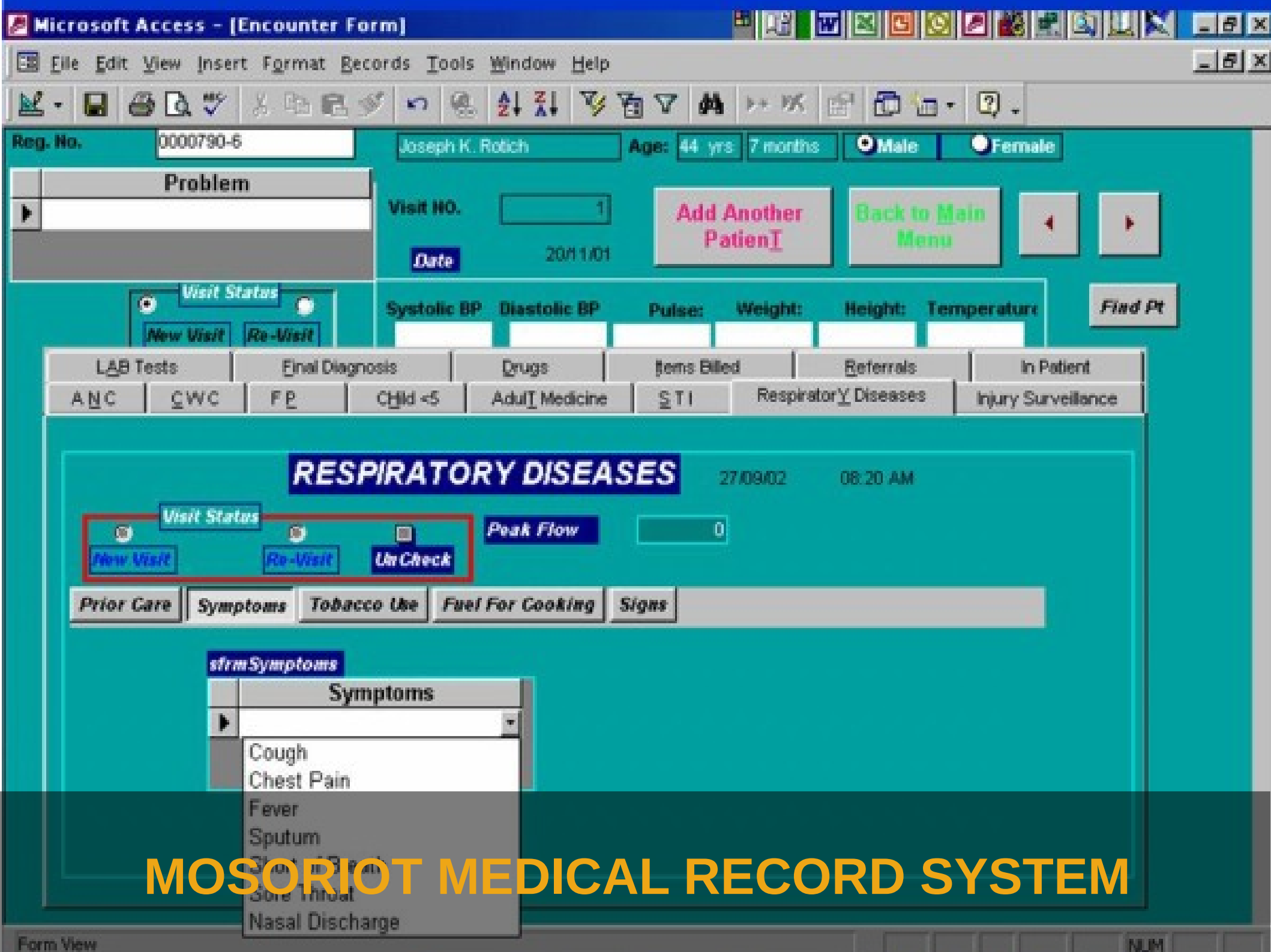
 Vous ne pouvez pas prescrire AZT et D4T.

OK

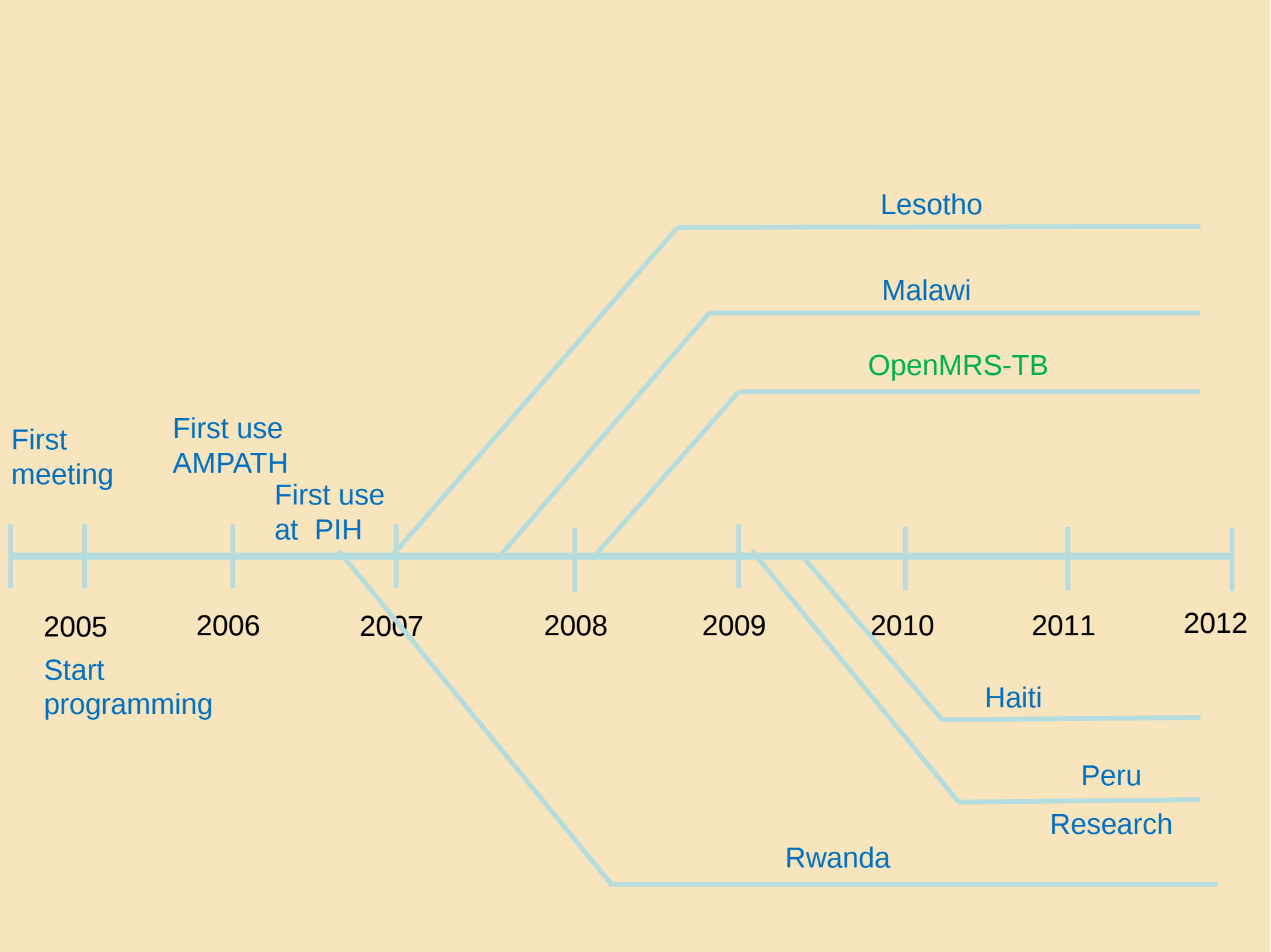
Si le patient prend plus de 5 médicaments, complétez cette forme plus d'une fois. [Spécifier regime complet](#)

Médicament, Dosage, et Unité	Date du début	Duration (jours)	Dose quotidienne	Matin/Midi/Nuit	Par semaine (1-7)
Regime contre VIH					
Stavudine (40 mg)	10 j avr m, 2003 a		2.0	1.0 1.0 0.0	7
Ce patient est allergique à Nevirapine (voir Données de Base) (changer médicaments)					
Nevirapine (200 mg)	10 j avr m, 2003 a	14	1.0	1.0 0.0 0.0	7
Nevirapine (200 mg)	24 j avr m, 2003 a		2.0	2.0 0.0 0.0	7
INH Prophylaxis					
Isoniazid (100 mg)	10 j avr m, 2003 a		3.0	0.0 0.0 0.0	7

PIH ELECTRONIC MEDICAL RECORD



MOSORIOT MEDICAL RECORD SYSTEM



Lesotho

Malawi

OpenMRS-TB

First meeting

First use AMPATH

First use at PIH

2005

2006

2007

2008

2009

2010

2011

2012

Start programming

Haiti

Peru

Research

Rwanda

OpenMRS “Starter Edition”

- Patient registration
- Form entry
- Data quality reports
- Clinical and programmatic reports
- Patient lookup/summary
- Decision support
- *Vocabulary “concept” management*

The **MOI TEACHING &
REFERRAL HOSPITAL**





THE AMPATH CENTRE



PHOTO: SHAWN WOODEN



KENYA PATIENT SUMMARIES

- The OpenMRS EMR system at AMPATH in Western Kenya was used to generate printed patient summaries including reminders for ordering repeat CD4 counts
- In the intervention clinic with computer-generated reminders, **CD4 order rates were significantly higher, compared to the control clinic: 53% vs 38%, OR = 1.80, CI 1.34 to 2.42, $p < 0.0001$**



RWINKWAVU INFECTIOUS DISEASE CLINIC



IMB ID: ██████████ HIVEMR-V1: 10257
 Gender: Male TRACnet ID: ██████████
 Age: 39 yrs (~Jan 1, 1970)
 Adult HIV PROGRAM: GROUP 19
 ON ANTIRETROVIRALS
 Last Visit: 4 months ago (Jan 7, 2009)
 ADULT RETURN VISIT by ██████████
 ██████████ @ Kirehe

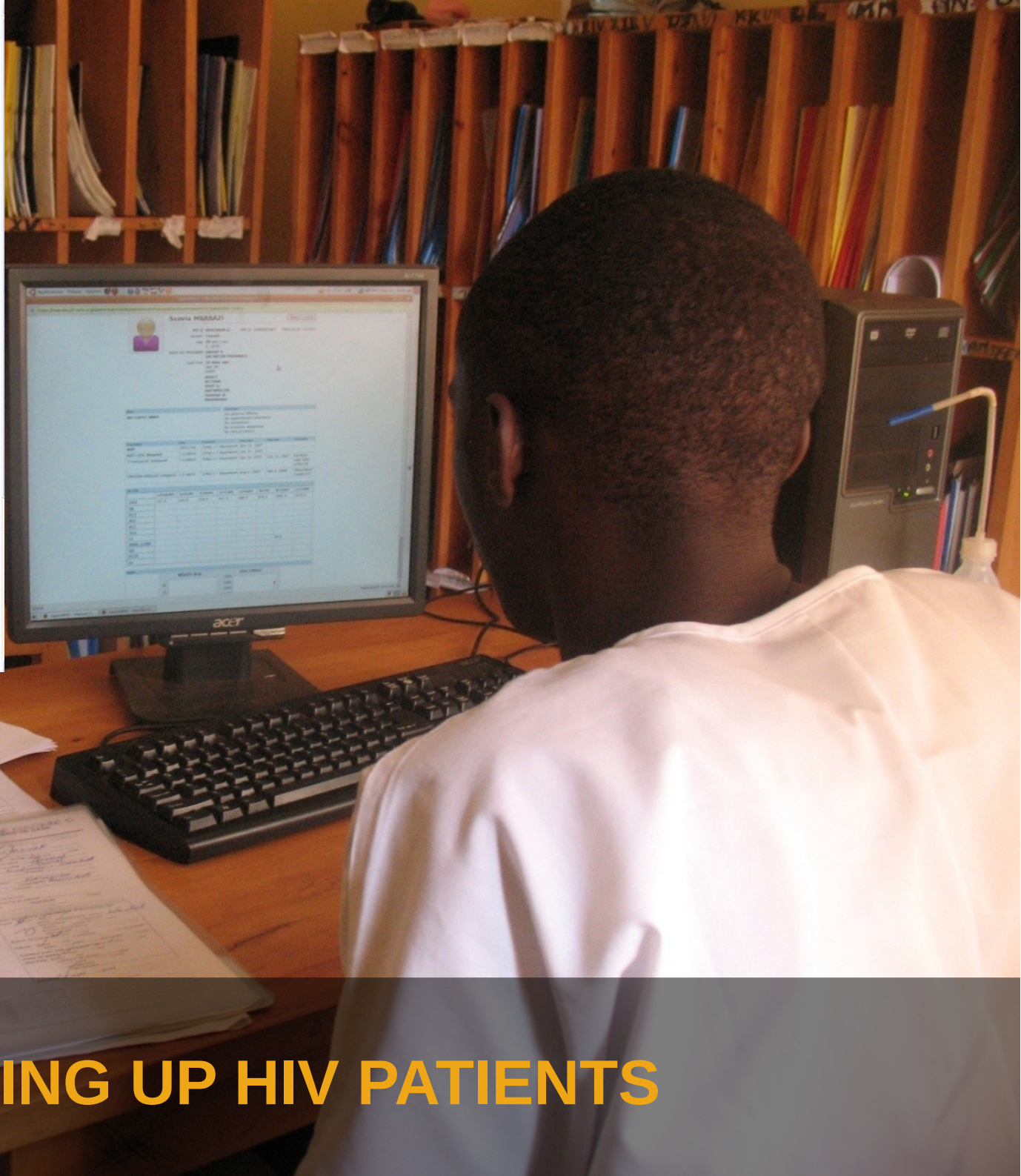
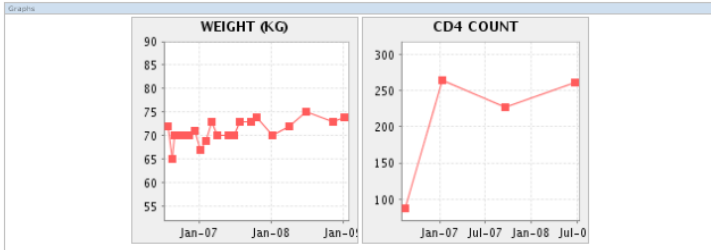
Back Print

Alerts	Comments
NO CHEST XRAY NO CD4 IN THE LAST 6 MONTHS	No adverse effects No opportunistic infections No previous diagnoses

Recent Symptoms	Date
FEVER	Jun 27, 2007
NIGHT SWEATS	Jun 27, 2007
COUGH	Jun 27, 2007
PRODUCTIVE COUGH	Jun 27, 2007
NIGHT SWEATS FOR LESS THAN 3 WEEKS	Jun 27, 2007

Drug Orders	Dose	Frequency	Start Date	Stop Date	Comments
Triomune-30	1.0 tab(s)	2/day x 7 days/week	Aug 12, 2008		
TMP/SMX 800/160	1.0 tab(s)	1/day x 7 days/week	Aug 18, 2006		
Triomune-40 (stopped)	1.0 tab(s)	2/day x 7 days/week	Jul 26, 2006	Aug 12, 2008	TREATMENT GUIDELINES CHANGED

Lab Tests	7/25/06	8/14/06	1/10/07	5/30/07	9/19/07	6/25/08
CD4		88.0	265.0		227.0	262.0
AST	20.8			50.64		
ALT	18.5			24.15		
Cr	55.51			89.8		



LOOKING UP HIV PATIENTS

RESULTS: CD4 COUNTS

- The proportion of CD4 counts conducted within the past 60 days but unknown to the clinician at the time of consultation was:
 - **24.7%** in the pre-intervention period
 - **16.7%** in the post intervention period
 - **32.4%** reduction in CD4 loss ($p=.002$)
- We are now extending direct clinician access to the EMR



TOUCH SCREEN PATIENT REGISTRATION



DEVELOPER TRAINING, RWANDA

RWANDA DEV TRAINING

- We ran a three year training program in Kigali for computer science graduates
- One year, mentored training course
 - Web development
 - Java programming
 - OpenMRS programming
 - Medical informatics
- 34 graduates over 3 years, 2009-11
- They support OpenMRS rollout as well as building software development capacity in Rwanda

[Home](#) | [Find Patient](#) | [Dictionary](#) | [Billing](#) | [Appointments](#)

[Find Pharmacy Order](#) | [Pharmacy Report](#) | **[Drug Dispensing](#)** | [Order List](#) | [Consumable dispensing](#)

Drug Dispensing

Patient	Pharmacy	Visit Date	Weight	Next Visit Date
Asmpta Umugwaneza <input type="button" value="Change"/>	PHARMACY SERVICES <input type="button" value="v"/>	<input type="text"/>	<input type="text"/>	<input type="text"/> (dd/mm/yyyy)

Drugs

Designation	Quantity Requested	Lot No / Solde (Expiration Date)
1. Amoxicillin (250)	<input type="text" value="12"/>	<input type="text" value="..."/> <input type="text" value="Fcf4 / 153 (2015-10-01)"/>

KACYIRU POLICE HOSPITAL, RWANDA

Patient Bill Payment

Insurance Owner Information

Names : James rukundo Gender : Male
 Birthdate : 23-Sep-1985 Age : 27 yrs
 Validity : 13-Nov-2012 / 28-Dec-2012

Beneficiary Information

Names : James rukundo Gender : Male
 Birthdate : 23-Sep-1985 Age : 27 yrs
 Policy Number : 1234

Insurance Company

Insurance : Mutuelle Rate : 90.0%
 Flat Fee : Rwf

James rukundo's Bill as on 2013-01-11

	Qty	Unit Price (Rwf)	Price (Rwf)	Insurance : 90.0 %	Patient : 10.0 %
1. Consultation médecin généraliste (pour KMH)	1	1080.00	1080.00	972.00	108.00
2. Consultation d'un médecin spécialiste (non référé) / nuit, week end et jours fériés	1	1800.00	1800.00	1620.00	180.00
3. Visite par le medecin generaliste en hospitalisation	1	300.00	300.00	270.00	30.00
Total :				2862.00	318.00

Amount Paid
 Rest

Collector
 Received Date
 Received Cash

[Print Bill](#)

PATIENT BILLING MODULE



LACOLLINE, HAITI



OBSERVED THERAPY, HAITI



OpenMRS Currently logged in as Evan Waters | [Log out](#) | [Change Task](#)

Lacolline Bettie test (Female) 01-Jan-1986 (Estimated) 2EGWXX

Patient Lookup

Encounter date

ZL Primary care diagnosis

ZL Primary care diagnosis non-coded

Confirm defaults

ZL Primary care diagnosis

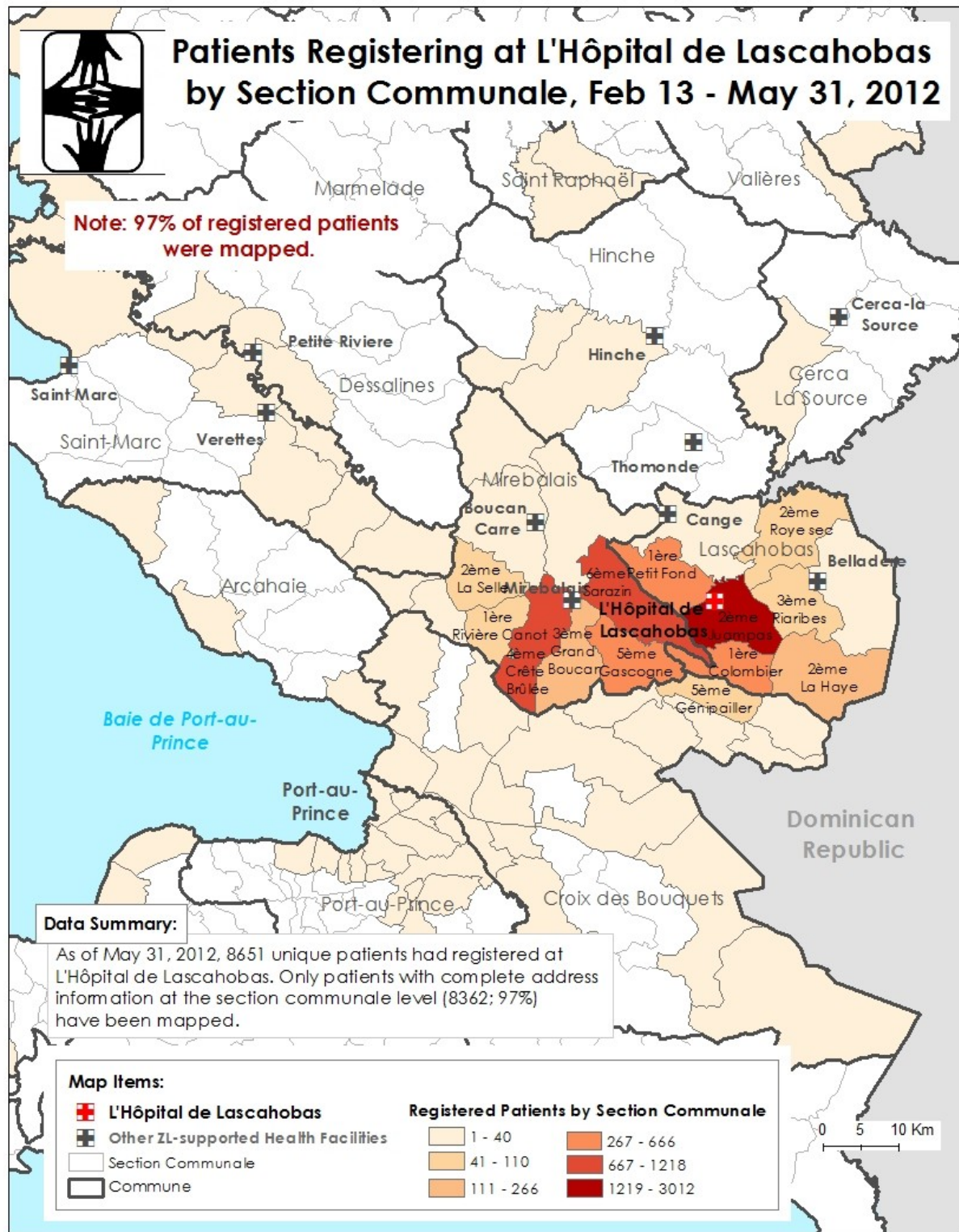
Fev

- (I00) Rheumatic Fever Without Heart Involvement
- (A91) Dengue Haemorrhagic Fever
- (A01.0) Typhoid Fever
- (A95.9) Yellow Fever

✖ ← →

PATIENT REGISTRATION, HAITI

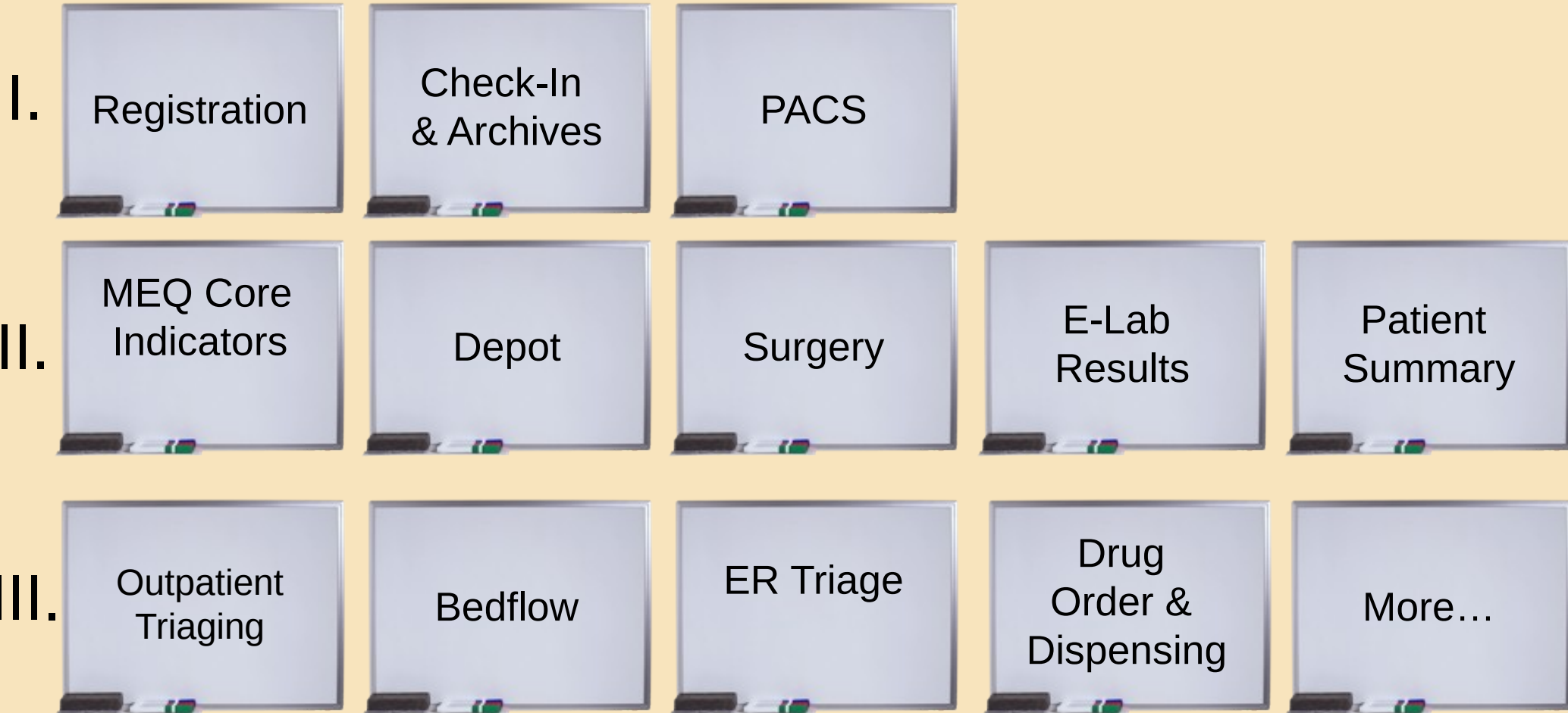
USING PATIENT REGISTRATION DATA





MIREBALAIS, HAITI

MINIMUM VIABLE PRODUCT:



Credit: Evan Waters

Create Record Requests

Create Selected

Name	Patient ID
Evan Orser	TT3NXR
Neil Orser	TT3P67
Neil Jazayeri	TT3PER
Renee Waters	TT3PM8
Mark Ioan	TT3PWT
Neil Goodrich	TT3R4A
Darius Goodrich	TT3RCV
Cosmin Craven	TT3RL9
Alexandre Goodrich	TT3RVU
Cosmin Ioan	TT3T57
Mário Hernandez	TT3T9Y
Neil Barbosa	TT3THF

- Select records to be printed
- Click to print records
- Scan records to send

Name	Patient ID	Location	Time	
erson	Y2DHXP	Antepartum ward	20:47 15/02	✗
il ernandez	Y2E011	Antepartum ward	20:47 15/02	✗
arius Areias	Y2602E	Antepartum ward	21:55 15/02	✗
ark Ball	Y26049	Antepartum ward	21:56 15/02	✗
nee Ioan	Y26081	Antepartum ward	22:32 15/02	✗
il Jazayeri	Y260AW	Antepartum ward	22:32 15/02	✗
arius Freire	Y260FL	Antepartum ward	22:41 15/02	✗
ernando elias	Y260HF	Antepartum ward	22:41 15/02	✗
an Ball	Y260M6	Antepartum ward	23:15 15/02	✗
arius Craven	Y260P2	Antepartum ward	23:16 15/02	✗
il Ioan	Y260VT	Antepartum ward	23:05 17/02	✗
arius Ball	Y260XM	Antepartum ward	23:05 17/02	✗
an Craven	Y2612D	Antepartum ward	12:33 18/02	✗



Scan card or enter Patient ID. Eg: Y2A4G4

Name	Dossier ID	Location	Time	
Ellen Craven	A002451	Antepartum ward	00:16 23/01	🖨
Darius Ball	A002452	Women's Internal Medicine A	00:16 23/01	🖨
Cosmin Freire	A002453	Antepartum ward	02:49 23/01	🖨
Darius Jazayeri	A002454	Antepartum ward	02:49 23/01	🖨
Darius Barbosa	A002455	Antepartum ward	14:35 23/01	🖨
Fernando Goodrich	A002456	Antepartum ward	14:36 23/01	🖨
UNKNOWN UNKNOWN	A002457	Outpatient Clinic	14:47 23/01	🖨
Neil Jazayeri	A002458	Antepartum ward	16:12 23/01	🖨
Emerson Barbosa	A002633	Antepartum ward	17:46 01/02	🖨
Renee Jazayeri	A002634	Antepartum ward	17:47 01/02	🖨
Emerson Waters	A002635	Antepartum ward	17:53 01/02	🖨

UI EVOLUTION – VERSION 2.0



MDR TB

Find Patient(s)

Find Patient(s)

Include Retired

1 to 1 of 1

Identifier	First	Middle	Last	Age	Gender	Birthdate	Health Center
1 44006563-G	Joia	Test	Mukherjee	28	F	~ 01/01/1981	Mulindi

Create Patient

To create a new person, enter the person's name and other information below. It is good practice to first verify that this person is not already in the database using the search box above.

Name

Birthdate

(Format: mm/dd/yyyy)

or Age

Gender

Male

Female

Create Person

DISEASE-SPECIFIC EMR (MDR-TB)

View All MDR-TB Reports

[WHO Form 05 Quarterly \(2008 version\)](#)

[WHO Form 06 6-month \(2008 version\)](#)

[WHO Form 07 Annual \(2008 version\)](#)

[WHO Form 07 Quarterly Report \(2006 version\)](#)


[WHO Form 08 6-month report \(2006 version\)](#)

[WHO Form 09 Annual Report \(2006 version\)](#)

View Drug Requirements

[drug requirements for next month](#)

[number of patients taking each drug](#)

 35 yrs (~01-Jan-1975) Health Center: Cange

BMI: 24.7 (Weight: 67.5 kg , Height: 165.0 cm) Regimen: **Ethionamide (Eto) , Ciprofloxacin (Cfx) , Pyrazinamide (Z) , Cycloserine (Cs) , P-aminosalicylic acid (PAS) , Capreomycin (Cm) , Moxifloxacin (Mfx)**

Last encounter: **Specimen Collection @ Cange | 19-Aug-2010 | Louise Allen**

MDR-TB program start date: **05-Apr-2007** Treatment start date: **05-Apr-2007**

Culture Status: **Unconverted**

Find Patient(s)

[Overview](#) | [Visits](#) | [Specimens](#) | [Regimen](#) | [Status](#)

Patient Overview

Patient Enrollment Date: 05/04/2007

[View Main Patient Dashboard](#) | [Edit Patient Information \(Short Form\)](#) | [Edit Patient Information \(Long Form\)](#)

Month	Date Collected	Smears	Cultures	Bacteria	INH	E	S	KM	CM	Ethio	CPX	R	Z	LFX	AMK	CFZ	CS	CLR	RFB	PAS	
PRIOR																					
BASELINE																					
0	05/04/2007	Treatment Start Date																			
1	01/06/2007	POSITIVE/++ N/A	++ N/A	M. TUBERCULOSIS COMPLEX	R	R	S	S	S	S	S	R	S				S				
2	04/06/2007	POSITIVE/POSITIVE N/A																			
	03/07/2007	- N/A																			
3	04/07/2007	-/- N/A																			
4	16/08/2007	-/- N/A																			
	17/08/2007	- N/A																			
5																					
6																					
7	10/11/2007	- N/A																			
	12/11/2007	- N/A																			
	20/11/2007	- N/A																			
	21/11/2007	-/- N/A																			

MDR-TB TREATMENT HISTORY FLOWSHEET

IMB ID:

Date: 18/03/2013 {dd/mm/yyyy}

Nom / Last name: **Test**

Prénom/ First name: **Wilms**

**Inshuti Mu Buzima
PIH Rwanda**

**Oncology Program / Programme d'oncologie
Registration & Demographic**
Demographics[Intake_ONCOLOGY_V1.2NT2012]June20 copy.doc

Clinic: Butaro Hospital

Clinicien/Provider: Choose a Provider

DEMOGRAPHICS AT INTAKE

Date of Birth	01/Jan/2006		
Sex	M		
Residence	Country	<input type="text"/>	--
	State/Province	<input type="text"/>	--
	District	<input type="text"/>	--
	City/Village	<input type="text"/>	--
	Cell	<input type="text"/>	--
	Umudugudu	<input type="text"/>	--
	Structured:	--	
Patient Telephone #	Primary	<input type="text"/>	Secondary <input type="text"/>
Family care-giver	Name:	<input type="text"/>	Relationship: <input type="text"/>
	Telephone:	<input type="text"/>	
On Mutuelle ?	<input type="checkbox"/> Mutuelle <input type="checkbox"/> None <input type="checkbox"/> Other: <input type="text"/> If Yes, Mutuelle level: <input type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> III		
Socioeconomic assistance	Already receiving: <input type="checkbox"/> Food Supplementation <input type="checkbox"/> School Financial assistance <input type="checkbox"/> Transport <input type="checkbox"/> Home construction Other: <input type="text"/>	Recommended: <input type="checkbox"/> Food Supplementation <input type="checkbox"/> School Financial assistance <input type="checkbox"/> Transport <input type="checkbox"/> Home construction <input type="checkbox"/> Other: <input type="text"/>	NOT Indicated
Accompagnateur	<input type="checkbox"/> NOT Recommended Existing Relationships for Patient: Accompagnateur: <input type="text"/>		
	Create new Relationship for Patient: Search for Person <input type="text"/>		
Type of referring facility	<input type="checkbox"/> Health Center <input type="checkbox"/> Referral Hospital <input type="checkbox"/> District Hospital <input type="checkbox"/> Other <input type="checkbox"/> N/A (not referred)		

Enter Form



- Patient List
- API Playground
- Cardiac Risk
- Got Statins?
- Med Adherence
- Med Calendar
- Med List**
- My App
- Problems

Med List | Timeline

- The List (j=down, k=up)

Medication	Instructions	
> Amoxicillin 875 MG Oral Tablet	1 bid	[images]
Cyclobenzaprine hydrochloride 10 MG Oral Tablet	1 tid prn	[images]
Hydrochlorothiazide 12.5 MG / Lisinopril 10 MG Oral Tablet	1 daily	[images]
Methylprednisolone 4 MG Oral Tablet	taper as directed	[images]
Niacin 1000 MG Extended Release Tablet [Niaspan]	1 qhs	[images]
Niacin 500 MG Extended Release Tablet [Niaspan]	1 qhs	[images]
rosuvastatin 10 MG Oral Tablet [Crestor]	1 qhs	[images]
rosuvastatin 20 MG Oral Tablet [Crestor]	1 qhs	[images]
sibutramine 10 MG Oral Capsule [Meridia]	1 daily	[images]
zolpidem 10 MG Oral Tablet	1 qhs prn insomnia	[images]

SUPPORT FOR SMART APPS

Manage Apps



EMPOWERING HEALTH WORKERS

Mobile Health Platforms Linked to OpenMRS





Prueba Ignorar RUT: 13457559-K

101 años (06-01-1910) Celular: 72122878 Numero Fijo: Centro médico: C.S. Bernardo Leighton

BMI: 7 (Peso, Height) CD4: Regimen:
Ultimo encuentro: Automatizado1 @ C.S. San Geronimo, 03-06-2011

Descripción Regímenes Encuentros Demografía Graficos Form Entry

Encuentros

Show 20 entries

Modificar	Ver	Fecha de Encuentro	Tipo de Encuentro	Proveedor	Formulario	Localidad	Digitador
		03-06-2011	Automatizado1	Super User	Automatizado Medicamentos 1	C.S. San Geronimo	Super User
		03-06-2011	Automatizado1	Super User	Automatizado Medicamentos 1	C.S. San Geronimo	Super User
		12-05-2011	Tratamiento	Administrador Cosmos	07. Formulario Post Alerta Medicamentos	C.S. Bernardo Leighton	Administrador Cosmos
		12-05-2011	Diagnostico	Joaquin Blaya	01. Formulario Datos Generales del Paciente	C.S. San Geronimo	Joaquin Blaya
		03-05-2011	Diagnostico	Administrador	04. Formulario Consejeria Pre-	C.S. San Geronimo	Administrador

BI-DIRECTIONAL APPROACH:

- Bottom up
 - Address clinical needs and problems
 - Ensure data quality
 - Local ownership and priorities
- Top down
 - Plan for wide use
 - Horizontal approach to disease healthcare
 - Core data set and use of open standards
 - Evaluation and evidence based decision making

RAPID GROWTH:

- Wide deployment to more than 50 LMICs
- National scale rollouts in Rwanda, Kenya, the Philippines
- Wider range of diseases: Oncology, Heart Disease, Diabetes, Primary Care, Surgery
- More direct point of care use
- Wider use as part of mobile health projects
- Linking to broader eHealth architecture projects



Infrastructure – power, hardware, networking, Internet

Software – OpenMRS, OpenBoxes, mobile tools, others

Staff – data entry, data manager, IT support

Leadership & management – clear focus on outputs and goals, knowledge of the capabilities of systems

Training – for all the above staff

5 CHAIN LINKS FOR EFFECTIVE INFO SYSTEMS

6 KEYS TO SUCCESS...

- Be collaborative from the start.
- Mix individual and organizational contributors.
- Keep an eye on goals of organizational partners.
- Focus on real problems and don't lose the big picture.
- Combine top down and bottom up strategies.
- Listen. React. Iterate.

** Your mileage may vary.*

THEMES ON THE HORIZON

- Making OpenMRS easier to set up and configure: *Proprietary solutions are the competition.*
- Reporting and data use – strengthening reporting tools and links to i2b2, Pentaho and other systems
- Improving UI, usability and hospital use
- Improved data synchronization
- Further engagement with universities and companies
- Use in more “developed” countries



FREE SOFTWARE SAVES LIVES.

dziękuję

shukriya

merci

ar kun

mauliate

amesege'nallo'

imena

ke itumela

zikomo

toda raba

THANK YOU

enkosi



OpenMRS
MEDICAL RECORD SYSTEM

spasibi

danke

ngiyabonga

go raibh maith agaibh

matur suksma

siyabonga

murakoze

agyamanac

asante sana

ngiyabonga

ndatenda

謝謝大家

terima kasih