

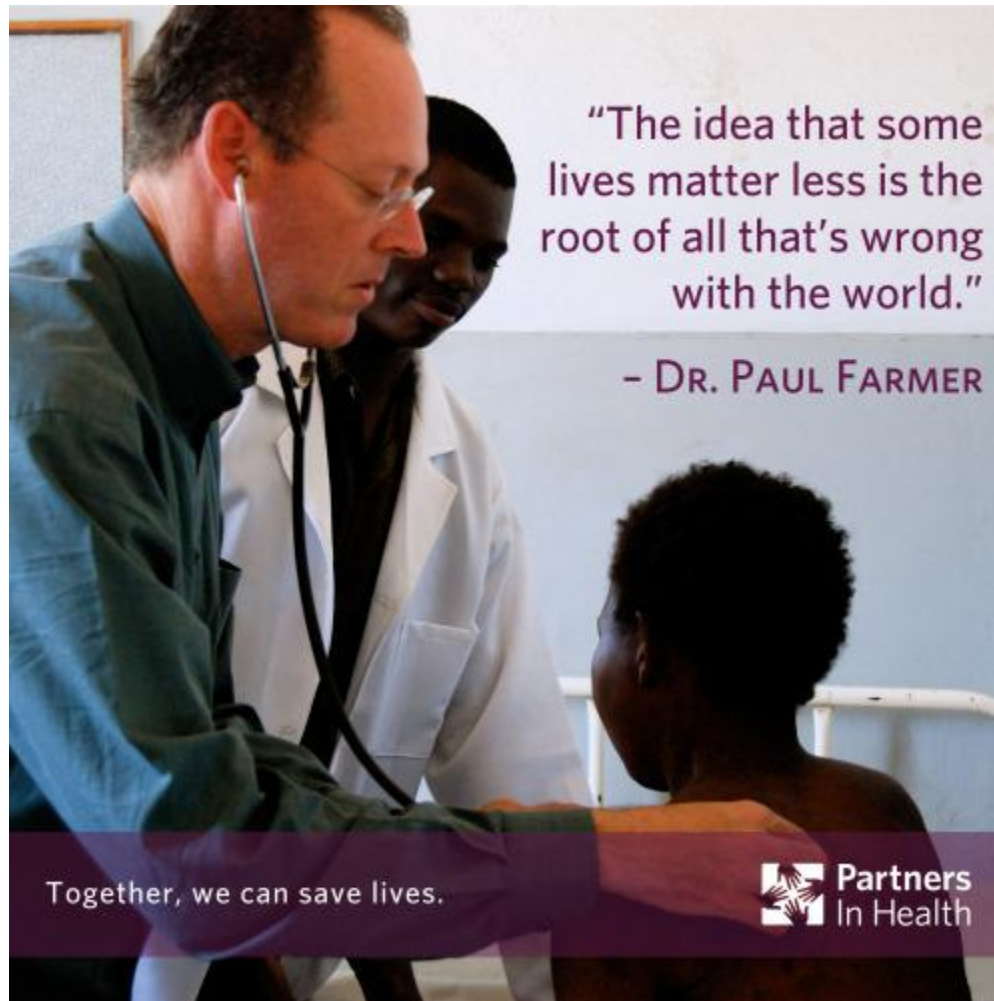


Partners
In Health

Implementing Electronic Medical Record Systems in Rural Haiti

LibrePlanet
March 22, 2015

Ellen Ball & Michael Seaton
Partners In Health
Medical Informatics
Boston, Massachusetts USA



“The idea that some lives matter less is the root of all that’s wrong with the world.”

– DR. PAUL FARMER

Together, we can save lives.



Partners In Health

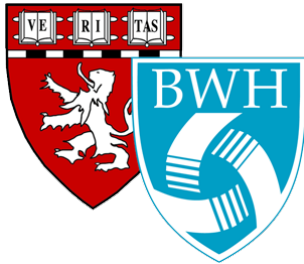
An aerial photograph of a vast mountain valley. The terrain is rugged and green, with a river winding through the center. In the distance, more mountain ranges are visible under a cloudy sky. The text is overlaid on the image.

Health is a human right.

Providing high-quality health care to poor and marginalized people—and inspiring others to do the same.

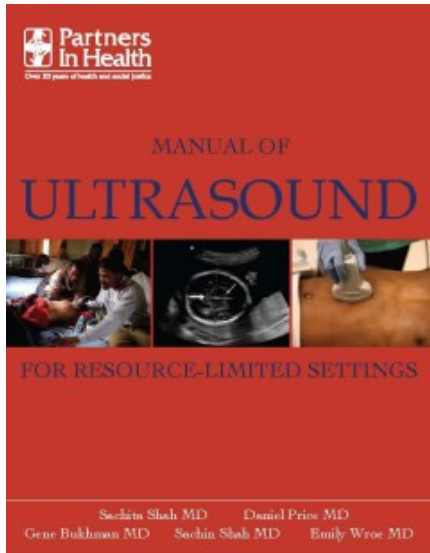
Our Mission

Service
Training
Advocacy
Research



The screenshot shows the Partners In Health website homepage. At the top left is the logo with the text "Partners In Health". To its right is a sign-up form for email updates with fields for "Email Address" and "Zip Code", and a "JOIN US" button. Further right is a "Knowledge Center" button. Below the header is a navigation menu with "Our Story", "Our Work", "Support Our Work", and "News", plus a "DONATE NOW" button. The main headline reads "Health is a human right." followed by the tagline "We're saving lives, revitalizing communities & transforming global health. Join us". Below this are three call-to-action buttons: "Ebola" (Learn about our response), "Give monthly" (and help us make lasting change), and "Join the fight" (Apply for Ebola positions with PIH). The main content area features a large video player showing a hospital scene with the caption "Haiti's University Hospital Celebrates Second Anniversary" (dated Mar 18, 2015). To the right of the video are three news snippets: "Malawi Floods: Update from Joe Lusaka" (Mar 20, 2015), "Four PIH Clinicians Returned to United States for Monitoring" (Mar 18, 2015), and "Dr. Paul Farmer: 'Redoubling Our Efforts'" (Mar 17, 2015).

Our Model



PIH | Engage

A grassroots movement
advancing the right to health



HUMAN RESOURCES
FOR HEALTH PROGRAM
REPUBLIC OF RWANDA



**REIMAGINING
GLOBAL HEALTH** AN INTRODUCTION
PAUL FARMER, JIM YONG KIM, ARTHUR KLEINMAN, and MATTHEW BASILICO



GHDonline

Improving health care delivery through global collaboration

Building a movement

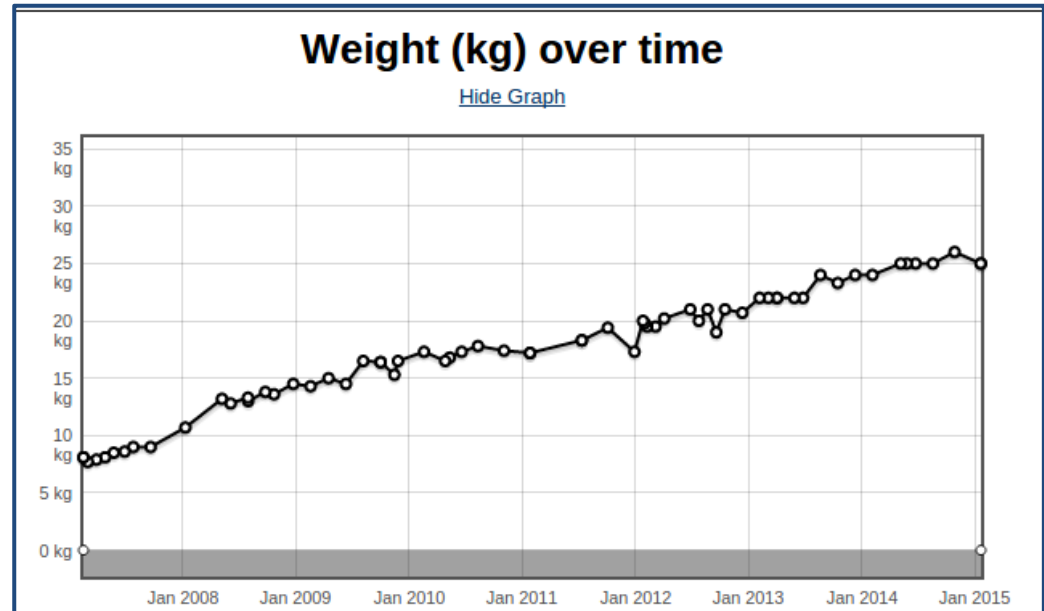
Information systems are a key component in PIH's model of care. To replicate the model of care, it is fundamental that open, scalable, maintainable, and high-quality information systems are available that meet the unique challenges found in resource poor settings

Why technology?

Clinical Decision Support

View trends that would be difficult or impossible to see otherwise

Alert clinicians to potentially dangerous situations (allergies, contraindications)



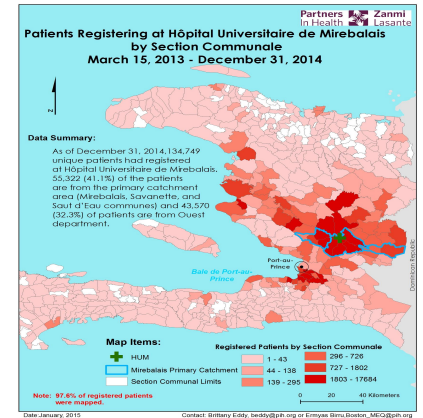
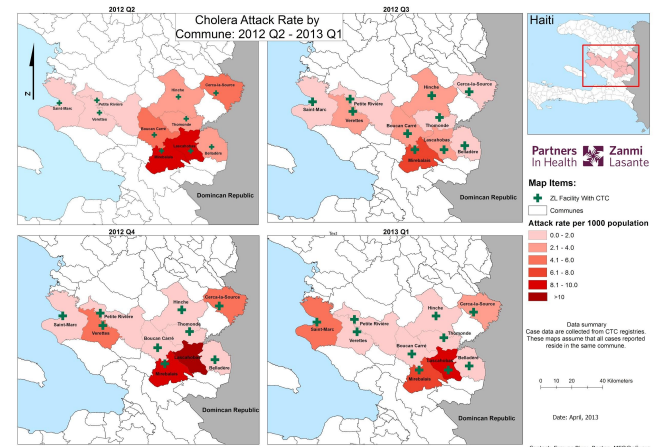
Why technology?

Disease Surveillance

Patients

Conditions

Improving access

Why technology?

Monitoring, Evaluation, and Quality Improvement

Analyze cohorts of patients. Find patient groups in need of follow-up or further analysis.

Identify areas of improvement (in what percentage of patient visits was a weight recorded)

Perform routine reporting to health ministries, funders, and program managers

	End date		1 week ago	
On ART	1229	+4	1225	+11
No appointment	12	-4	16	-13
Missed appt >2 <=3 weeks (6)	12	+3	9	-3
Missed appt >3 <=8 weeks (3)	28	+4	24	+10
Missed appt >8 <= 12 weeks (4)	4	-2	6	-3
Missed appt >12 weeks (5)	17	+1	16	+3
(1): A Patient can be counted multiple times if he/she trans (2): Missed appointments either due to data entry delay/err (3): "Potential Defaulters" (4): Defaulter in MoH definition (5): Latest at this time a defaulter tracking without any oth (6): To be verified by EMR team for data entry erros				
Missed appointment >2 <=3 weeks validation				
Reported by EMR			12	
Verified missed appointments				
Unable to verify				
Data entry error				

Why technology?

Support Advanced Treatment



CT Scan Order Form

Provider (required) Location (required)

Date (required)
21-03-2015

Type the name of a study:

Head without contrast (CT)
Head with contrast IV (CT)

Timing
 Routine STAT
Please select at least one study.

Why technology?



Unreliable
Internet and
power

Remote
facilities

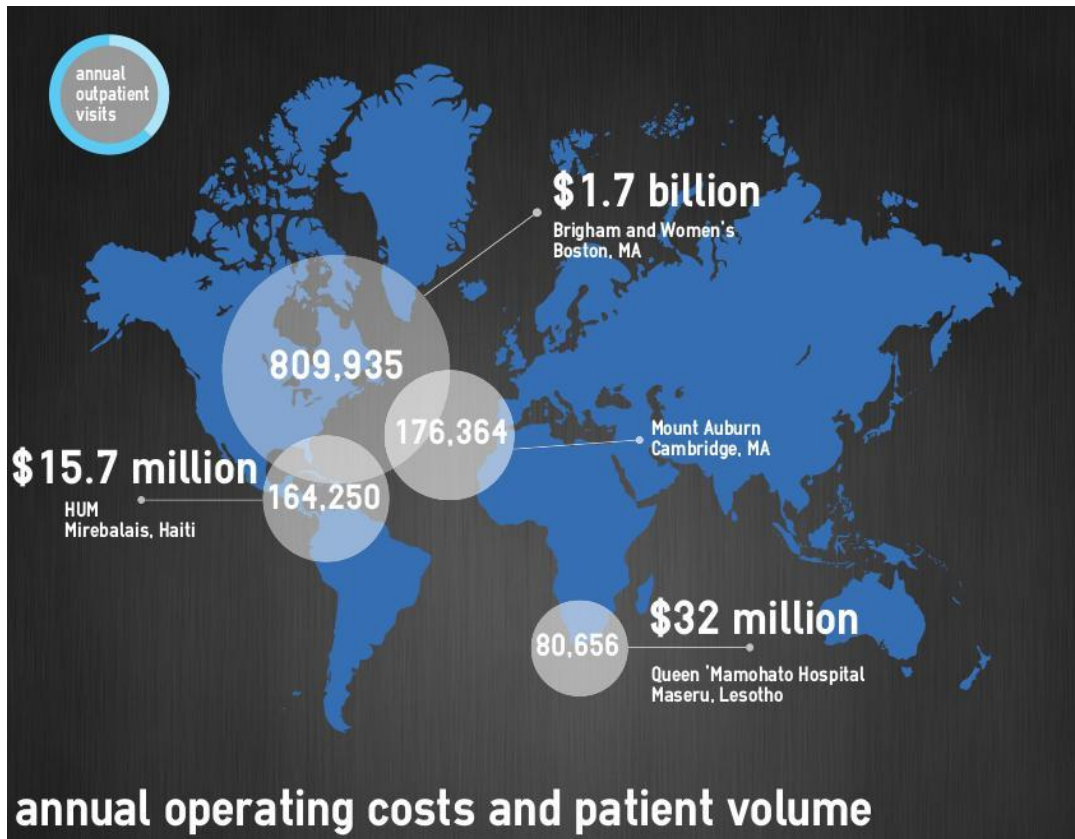
Challenges: Infrastructure



Few trained staff

High patient
volume.

Challenges: Human resources



No cost recovery from facilities

Low eHealth budgets

Challenges: Funding





PIH and Harvard Medical School win \$44.7 million Gates Foundation grant to fight drug-resistant TB in Peru.

In Haiti, Zanmi Lasante's HIV Equity Initiative is one of the first in the world to provide antiretroviral therapy in resource-poor settings.

2000

Partners In Health HIV Medical Record Zanmi Lasante

Home Page Report an Error No Messages Logout

 **HIV Electronic Medical Record** 

Hello Ellen Ball. ([Change Email/password](#)) Language: English

View this Patient	Enter Data
List all patients <input type="text" value="All sites"/> <input type="button" value="Alphabetically"/> <input type="button" value="By Entry Date"/>	Intake Form <input type="button" value="Current"/> <input type="button" value="Version 2"/> <input type="button" value="Version 1"/>
Find Patient <input type="text"/> <input type="button" value="Search"/>	Lab Result Entry <input type="button" value="Lab Results"/>
Pregnancies / PTME <input type="text" value="All sites"/> <input type="button" value="Search"/>	Find Patient <input type="text"/> <input type="button" value="Search"/>
PAM <input type="text" value="All sites"/> <input type="button" value="Search"/>	Accompagnateur <input type="button" value="Enter"/>
PCR Tracking <input type="text" value="All sites"/> <input type="button" value="Search"/>	Food study <input type="button" value="Enter"/>
OVC <input type="text" value="All sites"/> <input type="button" value="Search"/>	Patient Tracking <input type="button" value="Enter"/>
MDR-TB EMR <input type="button" value="Submit"/>	
Analysis	Site Administration
<input type="button" value="Analyze"/>	<input type="button" value="Administration"/>
Patient lists <input type="button" value="Calculate"/>	Stock Cards <input type="button" value="Stock Cards"/>
Data quality <input type="button" value="Calculate"/>	Shipment Tracking <input type="button" value="Shipment Tracking"/>
Drug Needs - EMR <input type="button" value="Calculate"/>	Uploaded Files <input type="button" value="Uploaded Files"/>
Patient Regimen List <input type="button" value="Calculate"/>	Possible Duplicate Patients <input type="button" value="Search"/>
Master Patient Lists <input type="button" value="Calculate"/>	Merge DdB and CD4 patients by name <input type="button" value="Merge"/>
Reports <input type="button" value="Reports"/>	

PIH creates drug-resistant TB EMR for Peru and HIV EMR for Haiti.

2001



PIH expands to sub-Saharan Africa, bringing community-based HIV treatment and primary care to two districts in rural Rwanda.

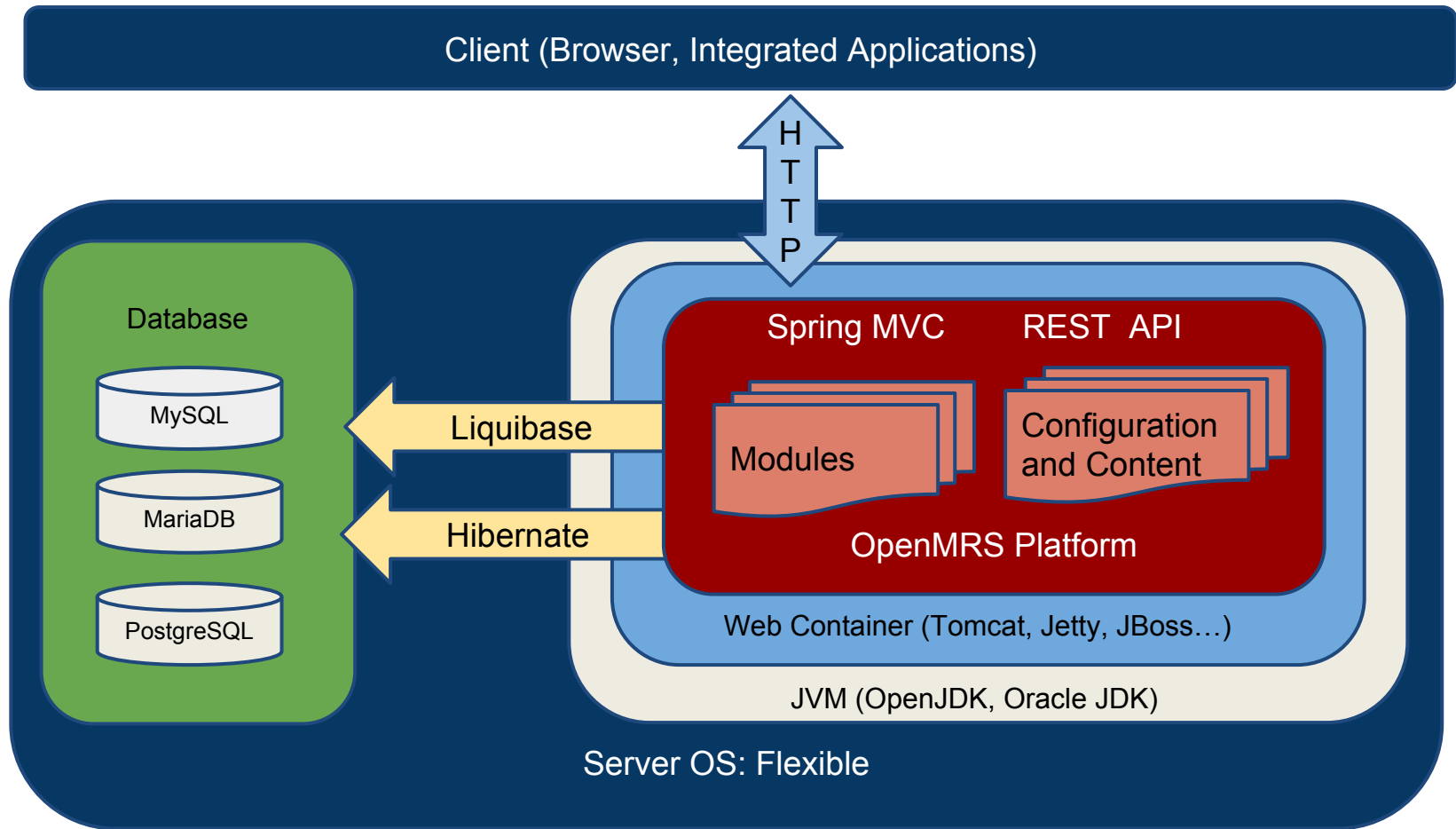
2005



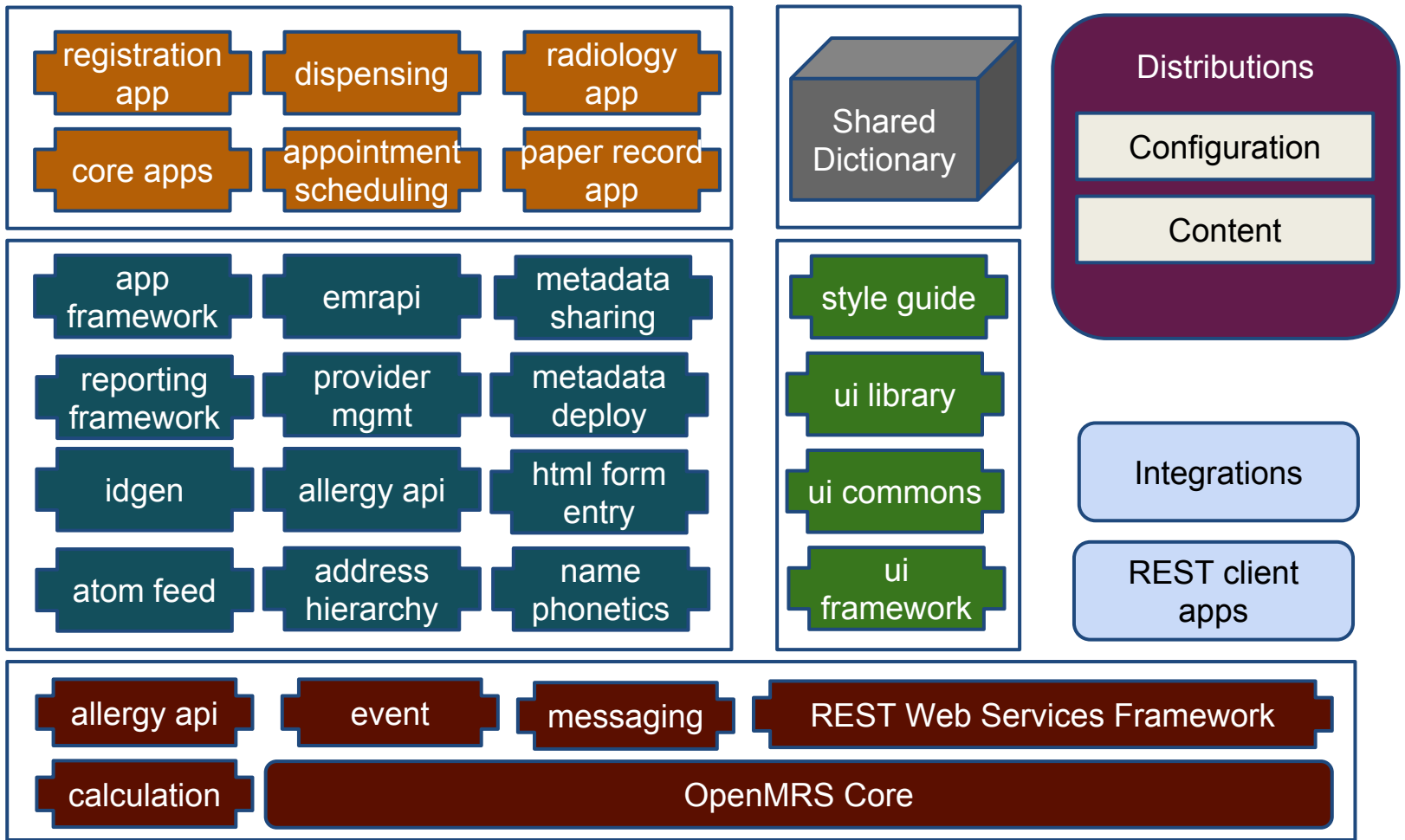
PIH begins collaboration with Regenstrief Institute to create OpenMRS.

- global health community
- free & open
- collaboration
- replication
- cost benefits

2005: Why OpenMRS?



Why OpenMRS? Free and open



Why OpenMRS? Modular

Flat Model

New data points require new columns

Name	Weight	Height
John Doe	150	65



Name	Weight	Height	Temp
John Doe	150	65	99

EAV Model

New data points require new rows.

Metadata dictionary enables associating more information describing each data point (eg. units, value ranges)

Concept	Units
Weight	lbs
Height	in



Concept	Units
Weight	lbs
Height	in
Temp	f

Name	Concept	Value
John Doe	Weight	150
John Doe	Height	150

Name	Concept	Value
John Doe	Weight	150
John Doe	Height	150
John Doe	Temp	99

Why OpenMRS? Flexible

English | Spanish | French | Italian | Portuguese

FAVORITE NUMBER

Add Synonym

Add Search Term

FAV_NUM

Question

Numeric

Absolute High

Admin | Manage HTML Forms | Preview HTML Form from File

Edit HTML Form

Show/Hide extra fields

Id 1

Name Test Form

Published

Retired

Form Schema: View

HTML:

```

<td><encounterProvider/></td>
</td>
</table>
</section>
<section headerLabel="Test Section">
<table class="baseline-aligned">
<tr>
<td>Name:</td>
<td><lookup class="value" expression="patient.personName"/></td>
</tr>
<tr>
<td>Favorite Number:</td>
<td><obs conceptId="3"/></td>
</tr>

```

OpenMRS

Currently logged in as Super User | Log out | My Profile | Help

Home | Find/Create Patient | Dictionary | Administration

Discard changes | Print

Mike Demo | Test Form (Initial) | (Unsaved Form)

Test Form (v1) Paper Form ID: 1

1. Encounter Details

Date: 03/21/2015 (mm/dd/yyyy)

Location: Choose a Location...

Provider: Choose a Provider

2. Demographic Information

Name: Mike Demo

Favorite Number:

Enter Form

Configurable and shareable metadata, including forms

Configurable components via editable settings

Customizable functionality, including overriding core pages, styles, logos via modules

Why OpenMRS? Configurable

Active forums

#OpenMRS on irc.freenode.net

Developers list: dev@openmrs.org

<https://talk.openmrs.org/>

<https://wiki.openmrs.org>

Regular (un)conferences



Many contributors with broad expertise

Thanks to the complete list of code contributors to OpenMRS 2.1:

[@alexis_duque](#), Andrew Szell, [@angshuonline](#), [@aniketha](#), Anton Kravchenko, Arathy-mac, [@bwolfe](#), [@burke](#), [@cintiadr](#), [@cioan](#), Damian Szafranek, Damitha Kithmal, [@dkayiwa](#), [@darius](#), [@endeepak](#), Filip Biedrzycki, Geoffrey W Wasilwa, Gitahi Ng'ang'a, Glauber Ramos, [@harsha89](#), Hemanth, Jakub Kondrat, [@k_joseph](#), Krzysztof Kaczmarczyk, Lech Rozanski, Lee Breisacher, [@lbat](#), Madawa Soysa, Marek Szukalski, [@mogoodrich](#), Mihir, [@mseaton](#), Miss Beens, Mujir Shaikh, [@marioareias](#), Nehashri P L, Neissi Torres Lima, [@ningosi](#), [@nyoman](#), Pamela Canchanya, Pawel Muchowski, Przemyslaw Gierszewski, Radek Puzdrowski, Radoslaw Puzdrowski, [@raff](#), Rohan Poddar, Rowan Seymour, [@sunbiz](#), Shruthi Dipali, [@suraj5](#), Sushmitha Rao, Vinay Venu, Vinkesh Banka, Wesley Spencer See, [@willa](#), [@wyclif](#), hemanths, indraneelr, Łukasz Gąsior



6 people liked this. [Like it too.](#)

Building the movement

- Not reliant on any one organization
- Evolving regional communities
- Supports scaling and replicating

Why OpenMRS? Community



AMPATH starts using OpenMRS in Kenya.

PIH Rwanda begins using OpenMRS in Rwanda.

2006



PIH begins work in Lesotho and Malawi, launching testing and treatment programs for HIV and TB.

PIH Lesotho and Malawi uses OpenMRS.

2007

Currently viewing: Active MDR-TB Program, started on 01/Jun/2007 at Hinche Only MDR-TB patients

[Overview](#) | [Chart](#) | [Visits](#) | [Treatment](#) | [Lab Results](#) | [Patient Details](#)

Program Status	MDR-TB Diagnosis															
Enrollment Date: 01/Jun/2007 Enrollment Location: Hinche Registration Group - Previous Drug Use: Unknown Registration Group - Previous Treatment: Unknown <input type="button" value="Edit Program"/> <input type="button" value="Close Program"/>	Resistance Type: Confirmed MDR-TB Resistance Profile: INH + R + E + Z + S + CM + KM + Ethio Site: Unknown <table border="1"> <thead> <tr> <th></th> <th>Result</th> <th>Date Collected</th> <th>Lab</th> <th>Date completed</th> </tr> </thead> <tbody> <tr> <td>Diagnostic Smear</td> <td>NEGATIVE</td> <td>28/May/2007</td> <td>Cange</td> <td>30/May/2007</td> </tr> <tr> <td>Diagnostic Culture</td> <td>MODERATELY POSITIVE (++)</td> <td>01/Jun/2007</td> <td>Cange</td> <td>13/Jun/2007</td> </tr> </tbody> </table>		Result	Date Collected	Lab	Date completed	Diagnostic Smear	NEGATIVE	28/May/2007	Cange	30/May/2007	Diagnostic Culture	MODERATELY POSITIVE (++)	01/Jun/2007	Cange	13/Jun/2007
	Result	Date Collected	Lab	Date completed												
Diagnostic Smear	NEGATIVE	28/May/2007	Cange	30/May/2007												
Diagnostic Culture	MODERATELY POSITIVE (++)	01/Jun/2007	Cange	13/Jun/2007												

Treatment Status: Currently on treatment			
Regimen	Start Date	End Date	Type
AMX/CLV + B6 + CFZ + CM + CPX + CS + E + INH + Moxi + PAS + Z	13/Dec/2008	Present	
AMX/CLV + B6 + CFZ + CM + CPX + CS + E + INH + Moxi + PAS + Z	13/Nov/2008	13/Dec/2008	
AMX/CLV + B6 + CFZ + CM + CPX + CS + E + INH + Moxi + PAS + Z	08/May/2008	13/Nov/2008	
AMX/CLV + B6 + CFZ + CM + CPX + CS + E + INH + Moxi + PAS + Z	22/Feb/2008	08/May/2008	
AMX/CLV + B6 + CM + CPX + CS + E + INH + Moxi + PAS + Z	02/Jan/2008	22/Feb/2008	
AMX/CLV + B6 + CM + CPX + CS + E + Ethio + INH + Moxi + PAS + Z	20/Dec/2007	02/Jan/2008	
AMX/CLV + B6 + CM + CPX + CS + E + Ethio + INH + Moxi + PAS + Z	01/Dec/2007	20/Dec/2007	
AMX/CLV + B6 + CM + CPX + CS + E + Ethio + INH + Moxi + PAS + Z	05/Nov/2007	01/Dec/2007	
AMX/CLV + B6 + CM + CPX + CS + E + Ethio + INH	30/Apr/2007	05/Nov/2007	

Bacteriology Status				
Smear Status: Not Converted				
Culture Status: Not Converted				
	Result	Date Collected	Lab	Date completed
Most Recent Smear	MODERATELY POSITIVE (++)	20/Jan/2012	Cange	24/Jan/2012
Most Recent Culture	POSITIVE	20/Jan/2012	Cange	31/Jan/2012
<input type="button" value="Add Test Results"/>				

HIV Status: Unknown	
Most Recent Test Result:	Unknown
ART Treatment:	Currently not on treatment

PIH develops OpenMRS MDRTB module for many countries and organization including Haiti, Pakistan, Nepal, and South Africa.

2009



PIH trains computer science graduates in Java and OpenMRS in Rwanda. 34 graduates in 3 years.

2009



PIH responds to a 7.0 earthquake in Haiti with lifesaving emergency care and a plan to strengthen Haiti's public health system.

PIH provides treatment and vaccination in response to cholera outbreak.

2010

“The new teaching hospital at Mirebalais will be a model for our national health system, offering high-quality medical services, a place for our clinicians to study and train, and hope and dignity to all who will seek—and offer—care there. We look forward to building upon our long-standing partnership with Partners In Health/ Zanmi Lasante with this desperately-needed facility.”

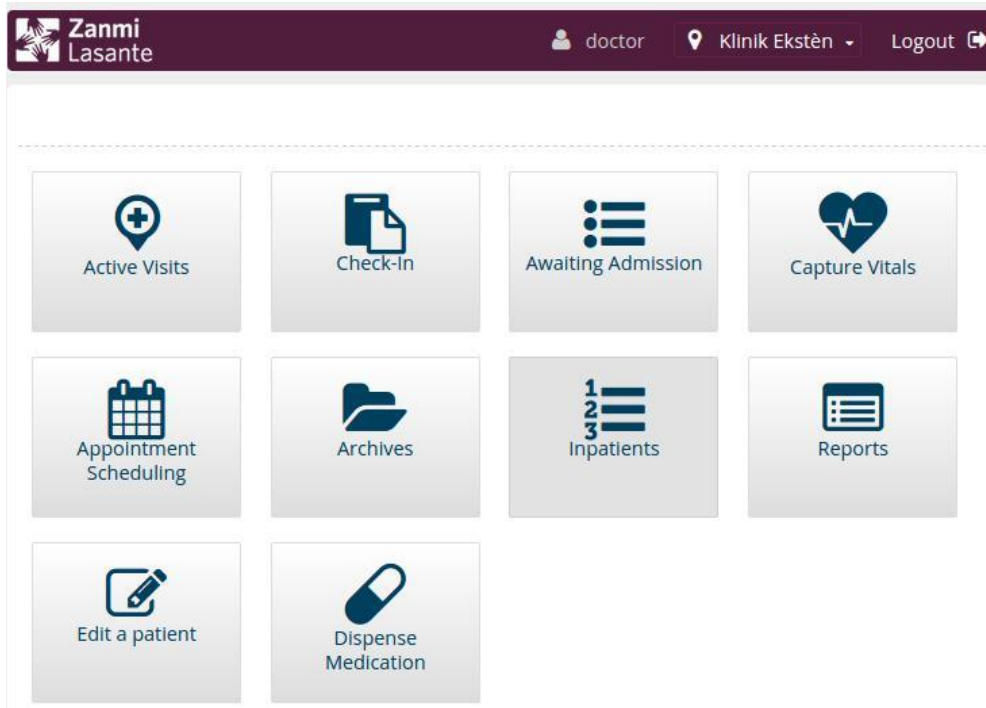
**— Dr. Alex Larsen,
Haitian Minister of Health**





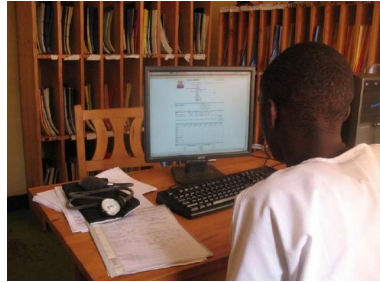
Clinical care
Point of care
Registration
Appointments
Vitals
Medications
Surgery

2013



PIH develops OpenMRS for University Hospital which becomes the basis of the OpenMRS 2.0 Reference Application.

2013



2013



Since March 2013:

150K unique patients

480K visits

1.3M encounters

6.7M observations

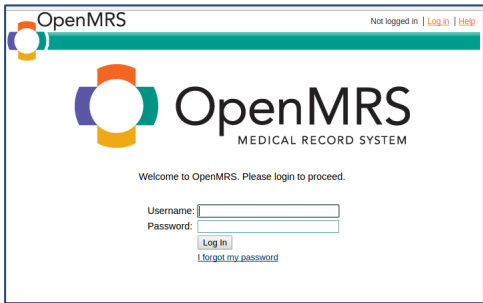
400+ users

2015: HUM by the numbers

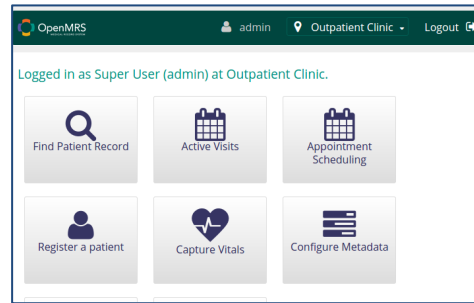


PIH continues ebola response work in Sierra Leone and Liberia, but transitioning to health care strengthening.

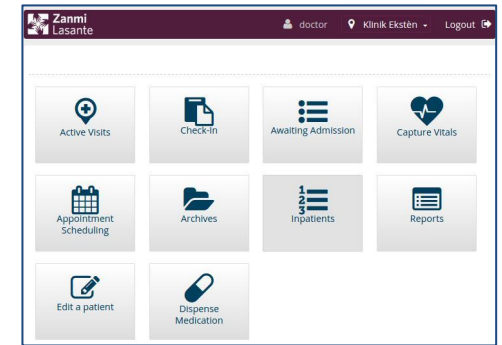
2015



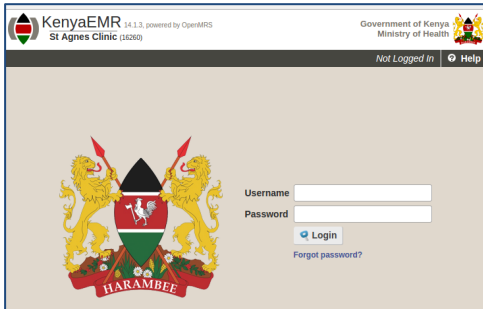
OpenMRS 1.x



OpenMRS 2.x



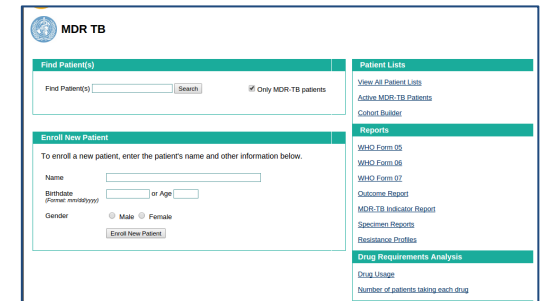
Mirebalais



KenyaEMR



Bahmni



MDR-TB

Distributions

- Partners In Health (pih.org)
 - Medical Informatics positions
 - Boston
 - Lesotho
 - Malawi
 - <http://www.pih.org/pages/employment>
 - PIH Engage
 - Donate
- OpenMRS community
 - Sprints / Bug fixes / Documentation
 - Google Summer of Code

Opportunities