Deploying Innovative Mobile-based Telemedicine Systems using Open Source tools in Resource-poor Areas of the Philippines

Jose Eugenio Quesada
Leo Anthony Celi
Christopher Moses

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Outline

- **The Problem**

- **The Solution: What is SANA?**

- **Components**
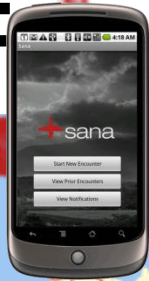
- **Philippine Pilot Implementation**

- **Conclusion**

The Philippine Situation

- **100 Million Filipinos**
- **51% live in the countryside**
- **1 Doctor per 10,000 population**
- **5 out of ten Filipinos die without getting any medical attention**

Case:

Manila

- **School Teacher in Batanes**
- **Has 75 year old father with incessant cough**
- **Flown to Manila for diagnosis**
- **Had to sell farm animals and farmland to pay for transport and medical costs**
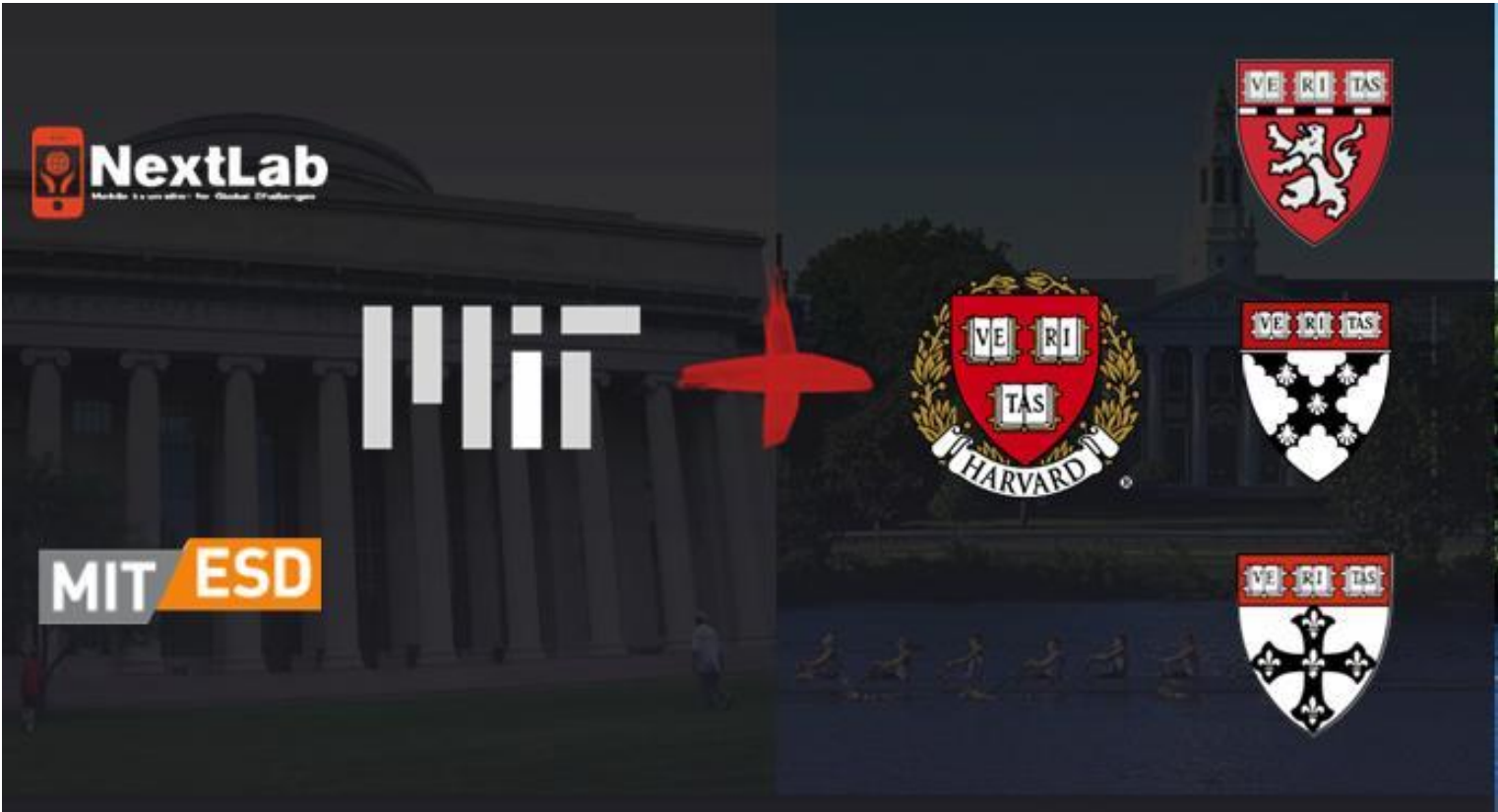- **Pushed into poverty**

In Italian the word Sana means "Healthy"
In Filipino the word Sana means " Hope"

SANA is a joint project of
Massachusetts Institute of Technology
and the Harvard School of Public Health

What is SANA?

Previous Mobile Telemedicine Systems:

- Text based Telemedicine systems 160 characters
- Other systems: bulky, expensive, not portable

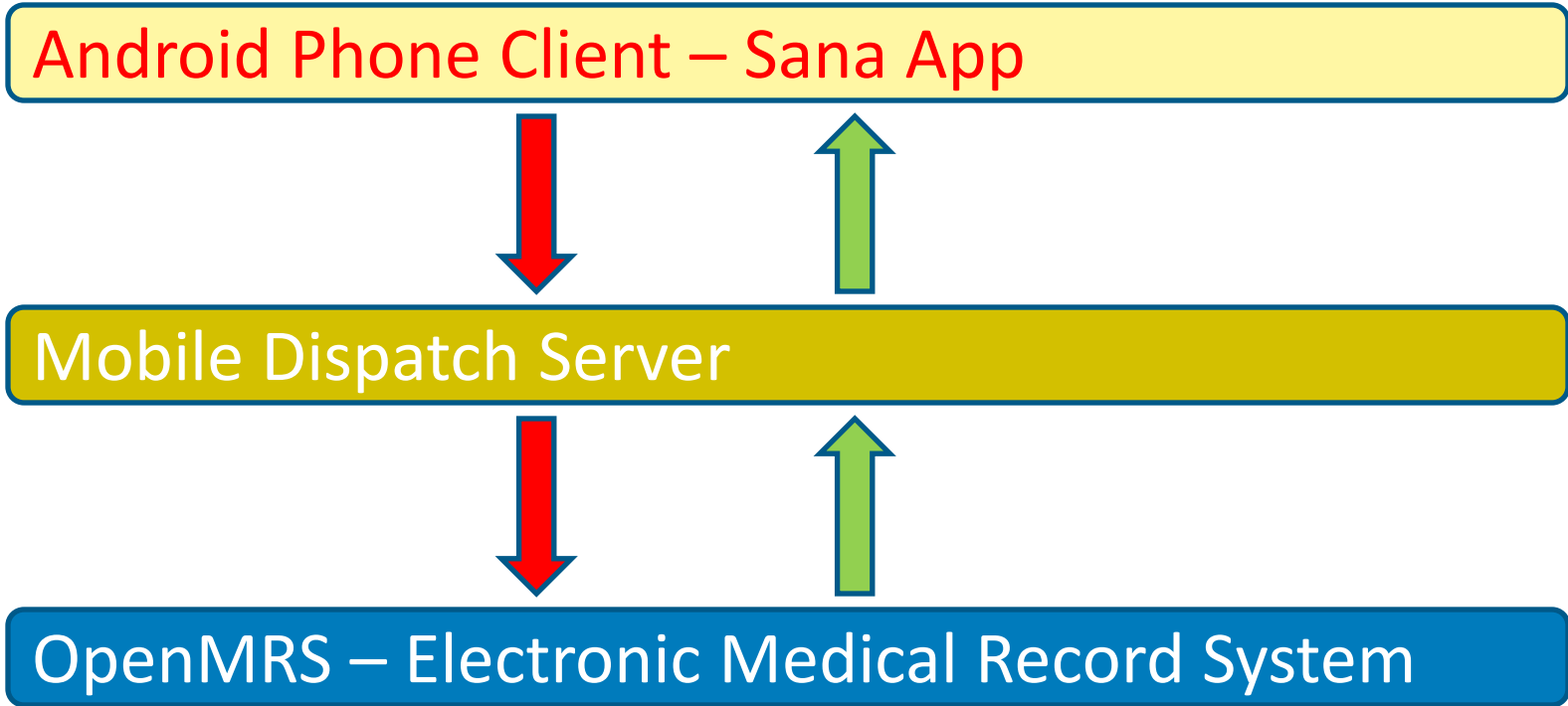SANA is a universal, mobile, clinical information platform

Components of SANA

Android Phone Client – Sana App

Mobile Dispatch Server

OpenMRS – Electronic Medical Record System

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Android Phone Client – Sana App
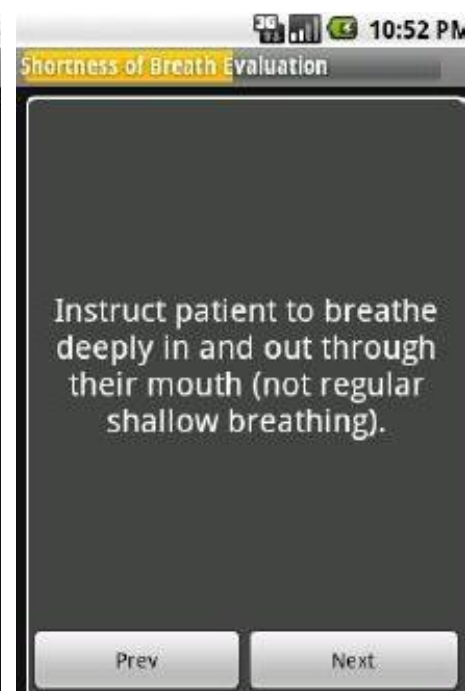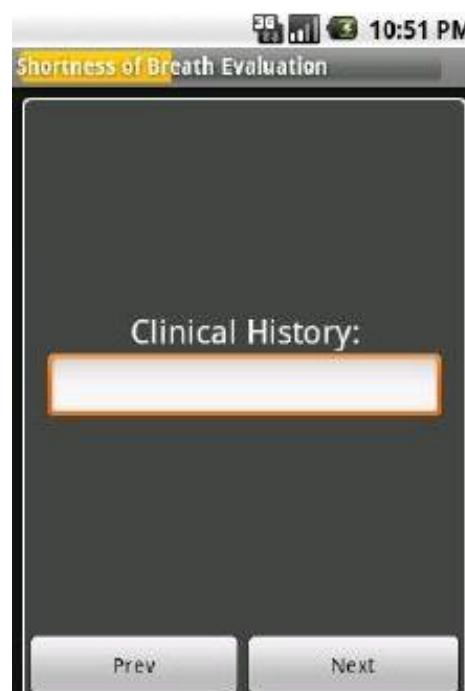
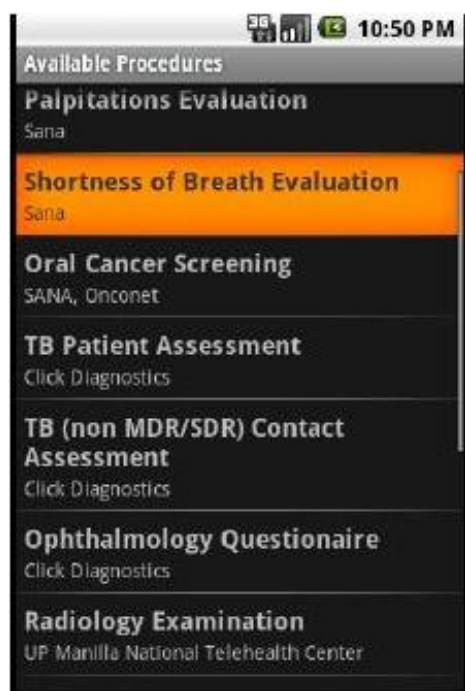Create customized procedures

Portable medical devices

Binary Data Capture (images, audio, others)

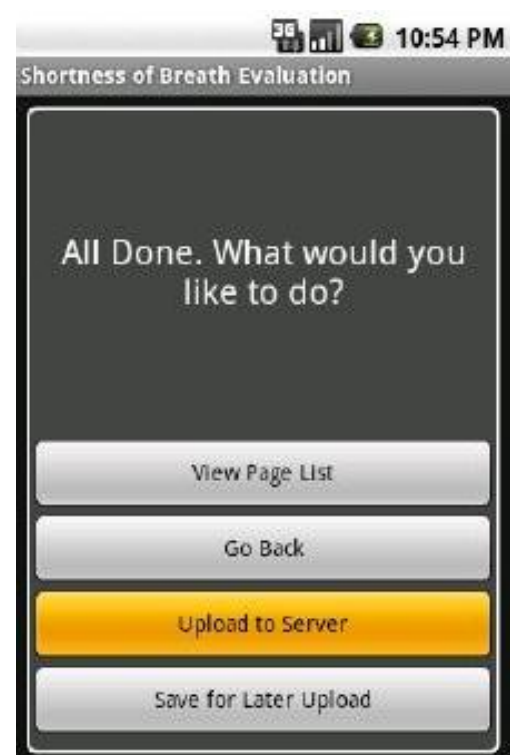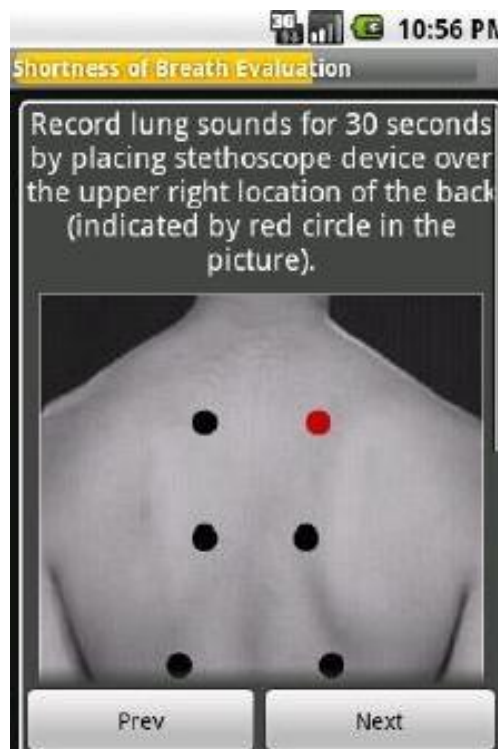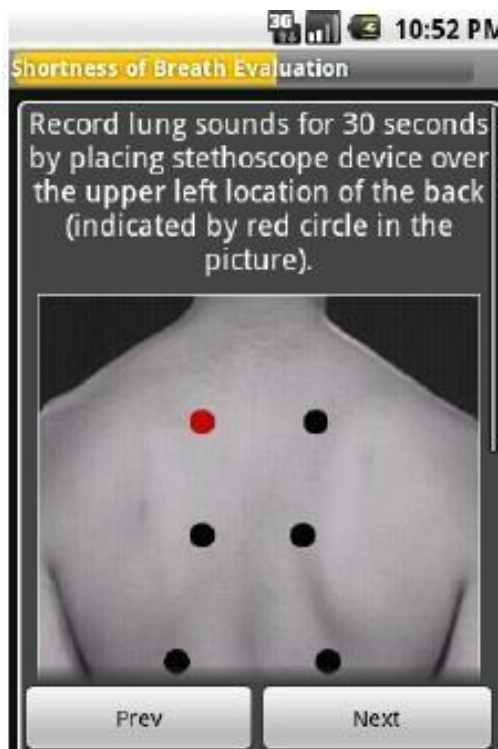Off-line data collection

Multiple methods of transmission

Android Phone Client – Sana App

Shortness of Breath Evaluation

Android Phone Client – Sana App

Shortness of Breath Evaluation

What is the Mobile Dispatch Server?

Bridge

Synchronization

Packetization

SMS Server

What is OpenMRS?

Open Source started 2006 (South Africa)

Open Standards HL7, LOINC, IXF

Central Concept Dictionary

Complex Data: Binary data

OpenMRS

OpenMRS

OpenMRS

OpenMRS

Cayugan, Erlinda (ID# 243) 60 F

Status: Closed

Date of Specialist Consult:
2011-10-05

Specialist:
Super User

Urgency Level:
Urgent

Diagnosis:
HYPERTENSION

Plan:
> for ECG; BP monitoring; lipid profile; UTS of KUB; >
Paracetamol 500mg/tab 1tab q 4* x prn >low salt low
fat diet
> since when did he start having high blood? > what is
the cholesterol level? when? > Describe the chest
pain, pricking? heaviness? radiating to the back?; how
long doe sit last? what are thje precipitating factors?
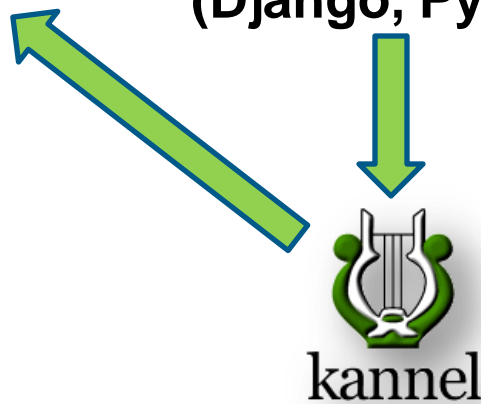
Components of SANA

**Phone Clients
(Android)**

**Mobile Dispatch Server
(Django, Python)**

python
django *The web framework for ponies with magical powers.*
powered

kannel

**Medical Record System
(OpenMRS, Java)**

Philippine Pilot Implementation

Strategic Partners in the Philippines

Implementation & Operations
- IT capacity & support
- Project management
- Training, monitoring and evaluation

Social Partner
- Existing relationships with clinical community & target patients
- Dedicated to improving health of rural poor

Medical Partner
- Medical specialists for back-end support
- Community hospitals or clinics to handle patient referrals

sana

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Implementation Partner

Academic Partner

Funding Partner

Social Partner and Medical Partner

Visayas Region – Social and Medical Partner

Metro Manila and environs – Social and Medical Partner

Philippine Pilot Implementation

Pilot Procedure (Hypertension)

Customization

Results

Philippine Pilot Implementation

Adaptation

Issues

Iterative Process

Full Implementation

Cost for implementation: 10 Phones, 1 year

Hardware Costs	Unit Cost (Euro)	Quantity	Total Cost
Android Smart Phone (ten units)	107	10	1,072
USB GSM Modem (one unit)	18	1	18
SMS Server (one unit)	268	1	268
Monthly Recurring Costs			
Virtual Private Server	200	12	2400
Monthly SMS cost	16	12	193
I.T. Maintenance Support	536	12	6,430
Software License Cost			
Open Source Software	0		0
Total Costs			10,381

Conclusion:

Sana enables cost effective healthcare in remote areas, answering the need for 50% of the Philippine population that die without ever receiving expert medical attention.

Conclusion:

The Sana Telemedicine system drastically lessens the cost of making expert medical care available in remote, rural areas.

"The whole is greater than the sum of its parts."
- Aristotle

Sana

Open Source Telemedicine

Questions?

Jose Eugenio Quesada

Integrated Open Source Solutions

Massachusetts Institute of Technology
Harvard School of Public Health
Asia Pacific College , CS Foundation

JLQUESADA@ioss.com.ph
http://ioss.com.ph/ http://sana.mit.edu/