# PILOT ASSESSMENT OF HIV VIRAL LOAD RESULT TURNAROUND TIMES PRE- AND POST-ASPECT REPORTER

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PROVIDING CONSULTING SERVICES IN THE AREA OF IOT IN EHEALTH

# **The Internet of Things**

From connecting devices to human value





### Case Study - Malawi



#### Situation

Viral load testing is a critical test for individual patient health as well as a measure of HIV Program success and for better understanding of community suppression rates.

The Malawi's Ministry of Health viral load program is growing will test more than 250,000 individuals in 2017

Little or no electricity at rural clinics

Harsh environmental conditions at clinics (high temps, high humidity, dust, insects)

#### Problem

Viral load and DNA-PCR testing are increasing with essentially the same number of healthcare workers to manage the workload.

Time from sample draw to results reporting was clinically significant (40+ Days)

#### Solution

Create an IoT solution to electronically capture test results from clinical analyzers in 10 regional laboratories and send them to a custom, solar powered IoT device in rural clinics via the cellular network. Include IoT to remotely monitor the performance of the device as well as solar panels, and operator performance.

# Overall TAT between paper-based result reporting and Aspect

Between November 2017-January 2018: A reduction seen in mean time to delivery of HIVVL results using Reporter (1.4 days; n=1371) versus paper (22 days; n=436) (P<0.001);

	Pre-Aspect	Post-Aspect
N =	436	1371
Mean (SD) Days	22.0 (30.8)	1.4 (2.2)
P-value	<0.001	

When the manual approval step was removed, the average time to result reporting on Aspect Reporter decreases to 0.7 days

95% reduction in lab to clinic TAT compared to paperbased reporting Paper-based reporting:5.7% transcription errors;4.7% missing results

# Next IoT Project



## Preparing an enhanced IoT Clinic Solution for Underserved Environments

#### **Medical Learning Hub**



Accelerate cost-efficient talent development

Peer-to-peer & e-learning platforms

#### IoT eHealth & Telemedicine



Multiply skilled access & develop capacity

Lab in the box to secure **primary** care diagnosis

Remote second opinion for **specialty** care through telemedicine

#### EMR/ EHR



Capture data even in frugal conditions

Analytic analysis to look at effectiveness of programs, users, devices, inventory, health, etc.

#### **IoT Supported Clinic Design**





#### **POC Devices**



Village Setting

Local Village Exam with patient history

**Primary** 

**Healthcare** 

Hemoglobin

**Pregnancy Test** 

Glucose

+Others

Lipids

Infectious Diseases Chikungunya Dengue Hepatitis HIVI&II Malaria Typhoid **Syphilis** 



#### **POC Devices**

- 12-channel ECG
- Fetal Doppler
- Pulse Oximeter
- Spirometer
- Stethoscope
- Thermometer
- Blood/ Urine devices
- **Blood Pressure monitor**

- Optical Reader for Blood & Urine Chemistry
- Hemoglobin meter
- Glucometer
- Lipid analyzer

#### Other devices

+ Other Devices and Tests can be int integrated based on requirements



Local EMR with Patient Records

#### **IoT Supported Clinic Design**



#### Village Setting





Village Exam with patient history

# Secure Internet

#### Regional Hospital or Government Health Services



#### Data Analytics

- Disease Management
- Epidemic Control
- HCW Efficiency
- Cost Analysis
- Remote POC Device Management



Tech Care for All

#### **IoT Supported Clinic Design**



# Advantages of IoT in healthcare

