



# *Technology Applications for Development*

*Stephen Rahaim*

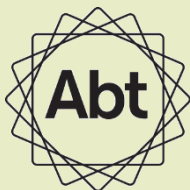
*Jeff Takle*

*Abt Associates*

*Society for International Development, June 20<sup>th</sup>, 2013*



# Changing Private Provider Behavior in Ghana



**SHOPS is funded by the U.S. Agency for International Development.**  
**Abt Associates leads the project in collaboration with**  
Banyan Global  
Jhpiego  
Marie Stopes International  
Monitor Group  
O'Hanlon Health Consulting

# Ghana case study

- Pediatric diarrhea a leading cause of morbidity, mortality for children < 5
- Caregivers seek care from OTC drug shops
- Not receiving WHO recommended treatment: ORS and zinc
- SHOPS providing broad range supply & demand side interventions



# About Ghana Licensed Chemical Sellers

- 7000+, variable education levels
- Licensed cadre created to serve rural, underserved areas where few pharmacists
  - Ghana Pharmacy Council is a role model for other regulatory bodies in the region
- High mobile phone ownership, low-end phones
- Attend regular face-to-face trainings as a condition of licensing

# Research to evaluate impact of text message reinforcement

**Barrier addressed:** Lack of knowledge and inappropriate prescription behavior among private providers

**Background:** ORS and zinc under-used and antimicrobials over-used for childhood diarrhea

## Research questions:

- Do text messages improve knowledge about ORS, zinc, and antimicrobials?
- Do text messages increase the prescription of ORS and zinc and reduce the prescription of antimicrobials?

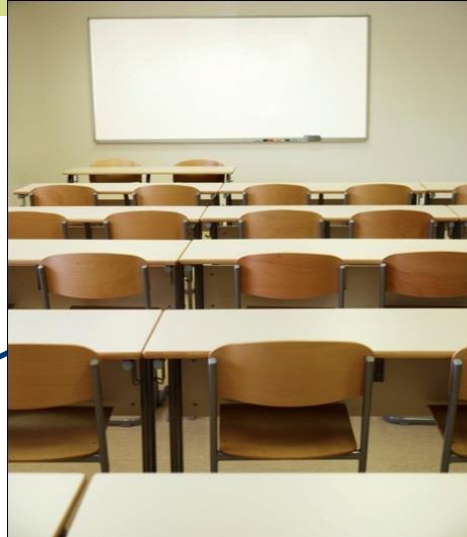
**Study design:** Randomized Control Trial (RCT)

**Data collection:** Provider and mystery client surveys (699)



# Research to evaluate impact of text message reinforcement

ALL LCS RECEIVE  
MANDATORY  
ZINC/ORS TRAINING



- **CONTROL**  
(n=472)  
Training only

- **TREATMENT**  
(n=472)  
Training + 3  
texts/week for  
8 weeks



# Implementation feedback: Messages received as welcome and helpful



*“Both tips & quizzes were very educative”*

*“The quizzes cast my mind back to the seminar”*



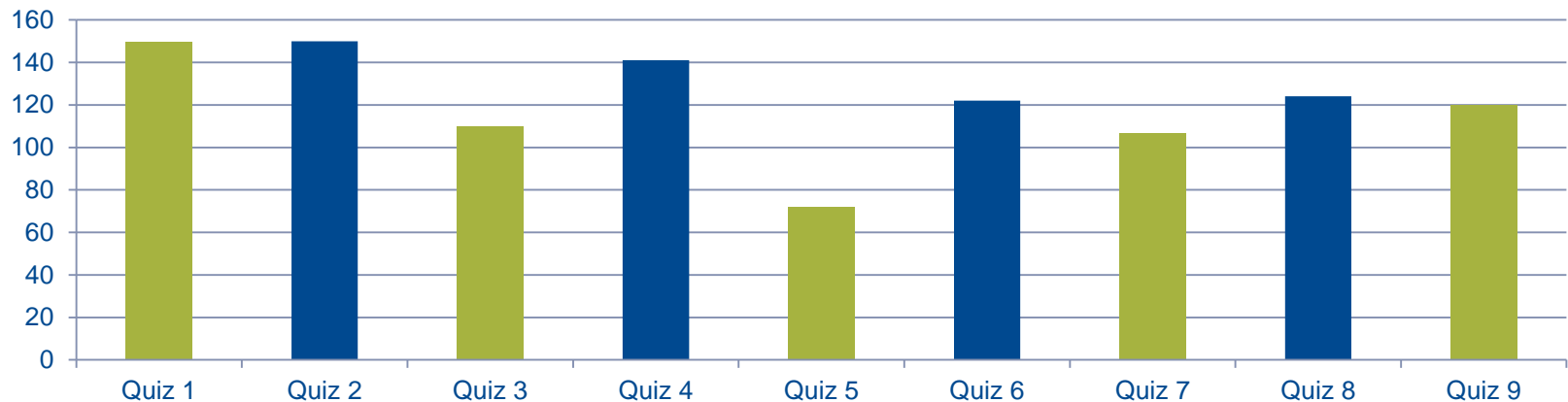
**Universal support for Pharmacy Council to continue use of reinforcing text education**

# Use of airtime incentives to increase participation

54% LCS text intervention group ever responded to quizzes

Following fall-off at Quiz 5, small airtime top-ups sent to sub-sets of eligible

## TOTAL RESPONSES



**RESULTS: Airtime recipients had modest increase in quiz participation compared to those with no top-ups**



# Challenges: Unexpected problems with correct formatting

## Total LCS Receiving SMS Quizzes

■ Responders ■ Non-responders



- Failure to use key word SHOPS
- Chatty replies: “SHOPS that is not the answer we learned”
- Literal replies: “Respond SHOPS A, B, or C”
- Other reasons responses not received
  - Don’t know how to open/send text
  - Too busy
  - Phone problems

**Responders & non-responders did not vary in adherence to recommended treatment**



**Majority non-responders said they read the texts (including correct quiz answers)**

# Ghana Impact Evaluation: *SMS Improves Knowledge, But Not Actual Behavior*

## **Key Findings**

- SMS led to improvement in knowledge and reported practices – step in the right direction
- SMS did not lead to improvement in actual practices
- Big differences in reported practices versus actual practices
  
- **Implications for Family Planning**
- SMS low-cost method to improve knowledge about practices
- However, changing knowledge alone insufficient
- Know – do gap needs to be addressed



# Verifying Environmental Compliance in 13 African Countries

*16 June 2013*

*Presented by: Jeff Takle, Director of Innovations*



# What is the project?



- Africa Indoor Residual Spraying (AIRS) protects millions of people in Africa from malaria by spraying insecticide on the walls, ceilings, and other indoor resting places of mosquitoes that transmit malaria.
- AIRS manages indoor residual spraying (IRS) operations and logistics in 13 endemic countries and provides enhanced entomological monitoring in Burundi and the Democratic Republic of the Congo.
- The project deploys insecticides, daily, to over 50,000 day laborers during spray cycles



# The Challenge



1. Insecticides must be handled according to country-specific hazardous materials guidelines, including the use of soak pits and special disposal mechanisms
2. It is notoriously difficult to verify the compliance of rural workers with environmental standards
3. Abt wants to actually meet the standards



# The Challenge



- Thousands of sites dispersed in rural areas
- Significant time constraints
- Need for visual verification and documentation
- Real-time Management and oversight





# The Solution



- ✓ Checklist  
Programmed into  
GPS enabled phone
- ✓ Survey Prompts to  
take photos at key  
points, (soak pits)
- ✓ Uploads data to  
server via mobile  
network or wifi
- ✓ Data can be mapped  
with GIS
- ✓ Planning, supervisory,  
visualization tool



# Real-Time Compliance Looks Like This



The image displays a Google Maps interface. On the left, there is a vertical zoom slider and a compass. The main map area shows a street grid in Washington, D.C., with a red location pin placed at the intersection of Dupont Circle and New Hampshire Avenue. A white street view window is open, showing a snowy street scene with a person walking. The window title is "Dupont circle and New Hampshire Ave" and it displays the coordinates "38.9098819167, -77.0429405167" and "accuracy: 16.0m". The map includes labels for various neighborhoods like Somerset, Friendship Village, and Cathedral Heights, as well as landmarks like American University and the Washington National Cathedral. Major roads like I-495 and I-270 are also visible. The bottom of the map shows the "Washington" label and a scale bar.

# The Results?



Africa Indoor Residual Spraying Program

**AIRS**

Home About What We Do **Where We Work** Results Resources

Home > Where We Work

### Where We Work

Like Tweet Print Email Share

15,980,685  
people protected from malaria

[Where does this number come from?](#)

Search...

AIRS Intranet

**Translate**

Select Language



# Takeaways



- Mobile isn't about just data collection forms any more
- Use the phone's accelerometer, GPS, camera, and other accessories
- Start looking at additional sensors that can be plugged into smartphones to enrich and extend the data possibilities!





Cepheid has made possible what has never been possible before in TB...real time national-scale insight into the results, errors, and logistics. This is an amazing advance. That we find inefficiencies in our processes is neither surprising nor a deterrent. It is an expected and natural evolution of discovery. The future looks like better patient results, faster diagnosis and faster treatment, and more efficient use of funds and logistics.

# INITIAL FINDINGS: Faster Response to MDR-TB through GxAlert

*16 April 2013*

*Presented by: Jeff Takle, Director of Innovations*



# Special Acknowledgements



- NTBLCP Nigeria
- KNVCV / TBCARE
- WHO
- DOD Nigeria
- MSH
- Cepheid



# What is GxAlert?



<http://youtu.be/JW3-28QEG2U>

## Per Device Costs

- USB modem \$20
- SIM \$4
- Data/yr ~\$5-\$10/yr
- Secure the data (*as appropriate*)
  - VPN/yr \$5
  - Antivirus, \$0-\$20/yr
  - Firewall, \$0
  - Disk encryption, \$50-\$100

Saw a  
**Return on Investment**  
in the first 2 weeks  
(see spoilage report)

# The Objectives of GxAlert



## Slow the spread of MDR-TB by



### Getting the MDR patient into treatment faster

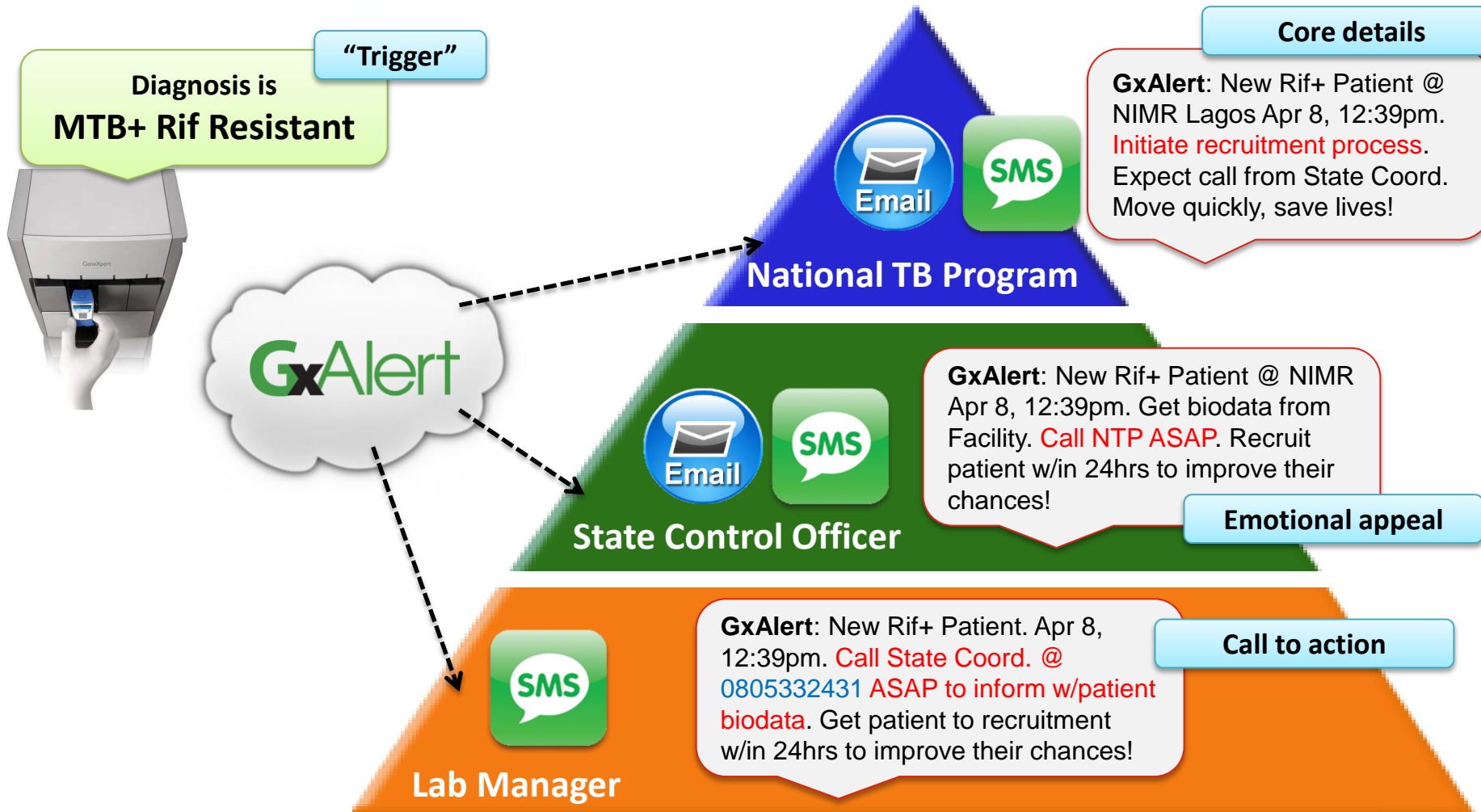
*Get the right drugs to patients faster.*

*Refer patients to the right facilities.*

*Reduce transmission.*

- **Improving data quality**
- **Speeding up reporting**
- **Creating real-time disease surveillance**

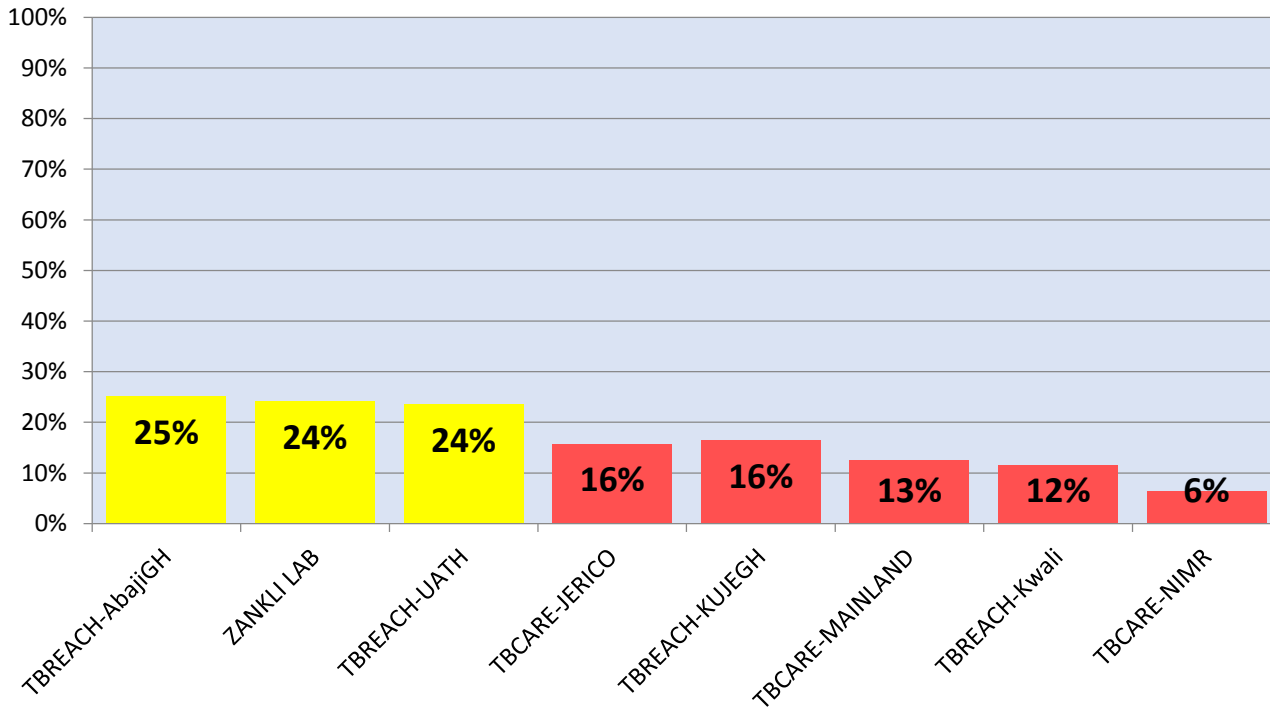
# One of the GxAlerts...



# MOH Can Forecast Cartridge Needs By Observing Consumption Trends



### Utilization Rate of GeneXpert by Facility, Lifetime



**Avg. # tests/yr per device**  
**438**

**Avg. Utilization per device**  
**18%**

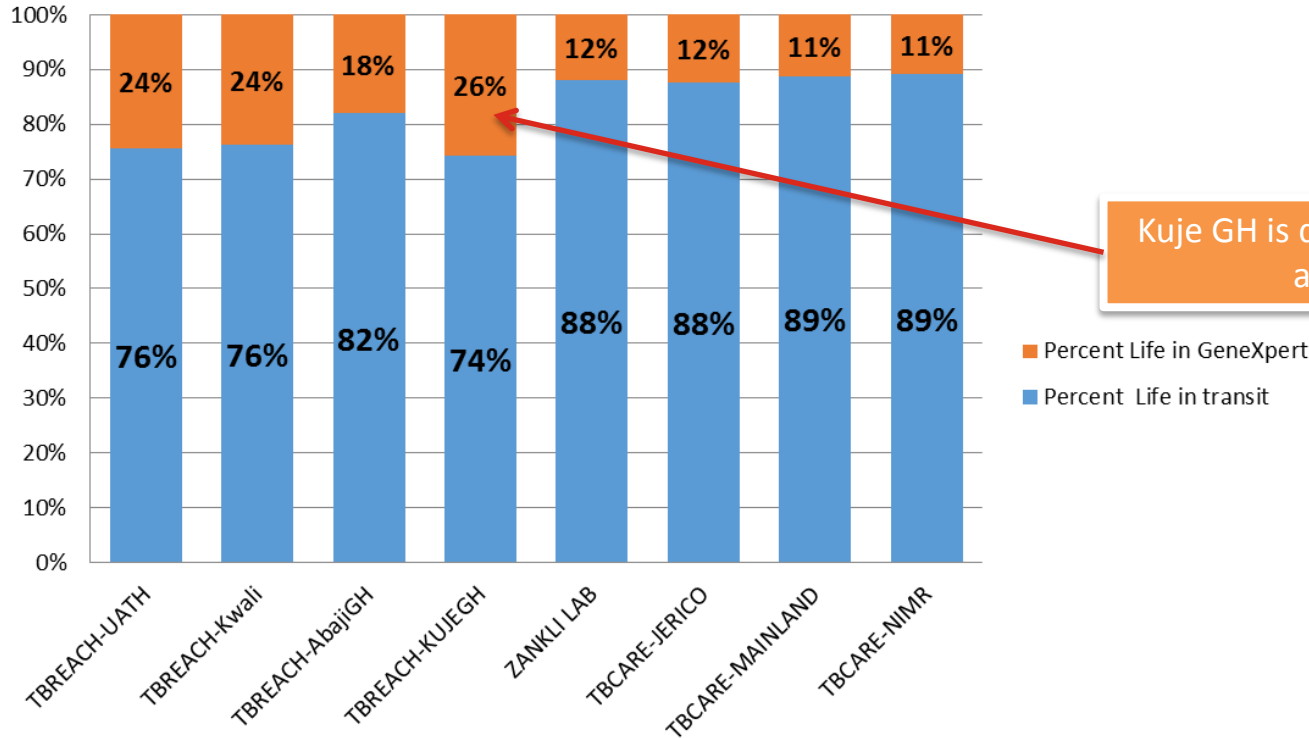
**Est. Overpurchase in Year 1**

**-\$103,114**

# MOH Can Better Allocate Inventory By Monitoring Cartridge Expirations



### Percent of Useful Life a Cartridge Spends in the GeneXpert Machines Versus in Transit



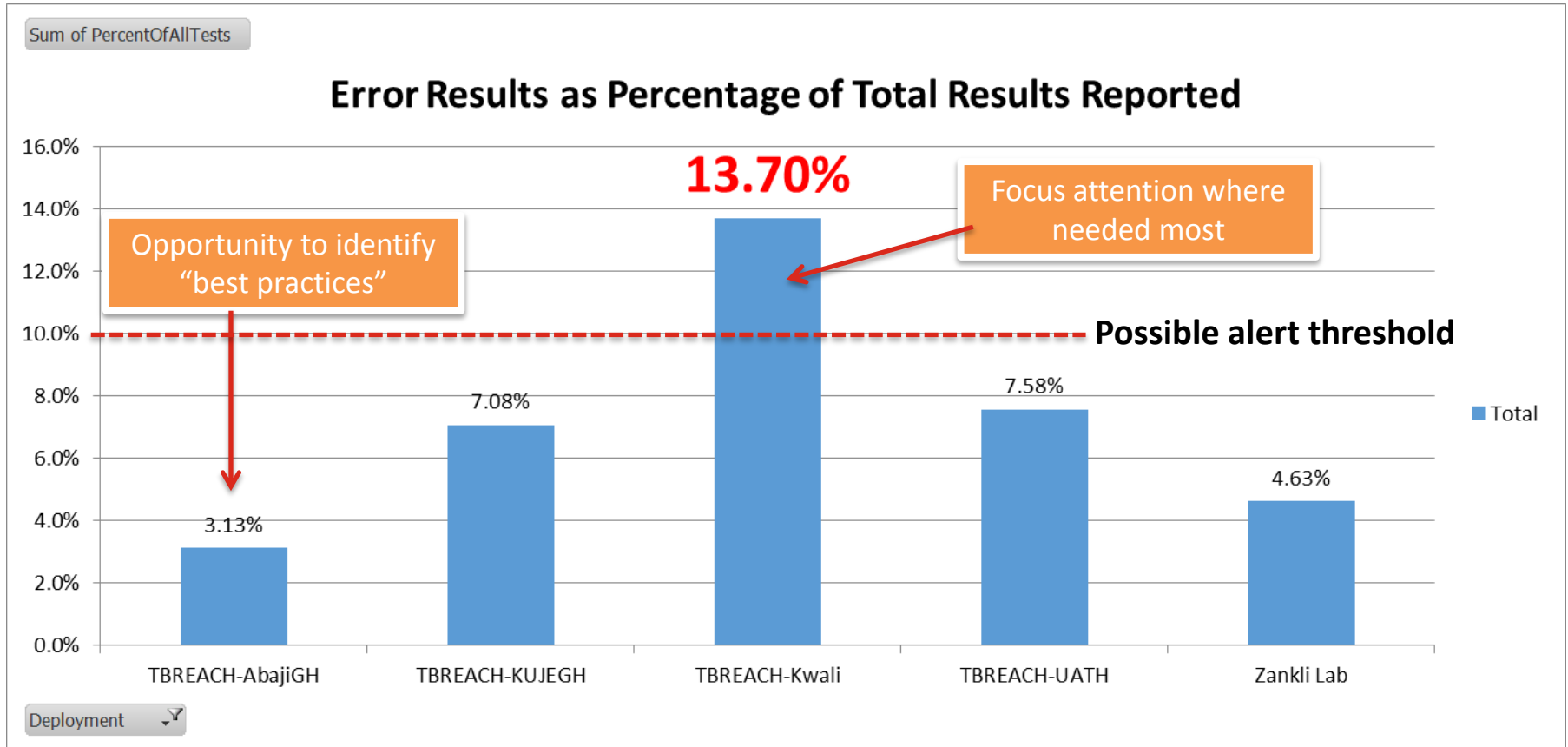
Kuje GH is doing the best at managing their aging inventory...how?

**Avg Mo. Useful Life Left**  
**2 1/2**





# MOH Can Set Thresholds for Errors: Above = Alert to Supervisor



# Partnership Model



GxAlert isn't a parallel system; it connects the data in *existing* systems faster, cheaper, with better quality

- **eTB Manager** – Already compatible w/GxAlert
- **OpenMRS** – *In progress*
- **WHO [data collection tool](#)** – *In progress*
- **GitHub [site](#)** – Complete

# What About Security?



## ■ Data at rest

- Norton360 anti-virus & firewall
- Symantec Whole Disk Encryption

## ■ Data in transit

- Glo VPN and APN at the SIM card level
- Hamachi VPN at the machine level

## ■ GxAlert Servers

- Amazon GovCloud, FISMA Moderate and HIPAA compliant. Read @ [www.GxAlert.com](http://www.GxAlert.com)

## ■ Secure API

# At What Stage Is GxAlert?



- **Going to national scale in Nigeria.** Covers 25% of Nigeria GeneXperts as of April 17, 2013. Continuing to roll out.
- Collecting data and evidence, sending SMS text alerts, data-driven insights to the National TB Program
- India currently scaling up in private sector (4 labs → 60 EOY)
- Beginning to integrate PL-HIV systems, OpenMRS, others
- Cost model proven/proving – will be made available on [www.GxAlert.com](http://www.GxAlert.com)
- Security model proven – documentation on [www.GxAlert.com](http://www.GxAlert.com)

# Better patient treatment

## Faster response to MDR-TB

More efficient TB logistics



**BOLD  
THINKERS  
DRIVING  
REAL-WORLD  
IMPACT**

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Thank You!



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