Technology Applications for Development

Stephen Rahaim
Jeff Takle
Abt Associates

Society for International Development, June 20th, 2013
Changing Private Provider Behavior in Ghana
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
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

“The quizzes cast my mind back to the seminar”

“Both tips & quizzes were very educative”

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

RESULTS: Airtime recipients had modest increase in quiz participation compared to those with no top-ups
Challenges: Unexpected problems with correct formatting

- 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 Results?

15,980,685 people protected from malaria
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.
Special Acknowledgements

- NTBLCP Nigeria
- KNCV / TBCARE
- WHO
- DOD Nigeria
- MSH
- Cepheid
What is GxAlert?

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
- Improving data quality
- Speeding up reporting
- Creating real-time disease surveillance
One of the GxAlerts...

Diagnosis is MTB+ Rif Resistant

“Trigger”

GxAlert: New Rif+ Patient @ NIMR Lagos Apr 8, 12:39pm. Get biodata from Facility. Call NTP ASAP. Recruit patient w/in 24hrs to improve their chances!

GxAlert: New Rif+ Patient @ NIMR Apr 8, 12:39pm. Initiate recruitment process. Expect call from State Coord. Move quickly, save lives!

Core details

Emotional appeal

Call to action

Lab Manager

State Control Officer

National TB Program

Email

SMS

GxAlert: New Rif+ Patient. Apr 8, 12:39pm. Call State Coord. @ 0805332431 ASAP to inform w/patient biodata. Get patient to recruitment w/in 24hrs to improve their chances!
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

<table>
<thead>
<tr>
<th>Location</th>
<th>Percent Life in GenXpert</th>
<th>Percent Life in Transit</th>
</tr>
</thead>
<tbody>
<tr>
<td>TBREACH-LA</td>
<td>24%</td>
<td>76%</td>
</tr>
<tr>
<td>TBREACH-Kwai</td>
<td>24%</td>
<td>76%</td>
</tr>
<tr>
<td>TBREACH-AbijGH</td>
<td>18%</td>
<td>82%</td>
</tr>
<tr>
<td>TBREACH-KUEGH</td>
<td>26%</td>
<td>74%</td>
</tr>
<tr>
<td>ZANKU-LAB</td>
<td>12%</td>
<td>88%</td>
</tr>
<tr>
<td>TRCARE-JERCO</td>
<td>12%</td>
<td>88%</td>
</tr>
<tr>
<td>TRCARE-MAINLAND</td>
<td>11%</td>
<td>89%</td>
</tr>
<tr>
<td>TRCARE-NMR</td>
<td>11%</td>
<td>89%</td>
</tr>
</tbody>
</table>

Kuje GH is doing the best at managing their aging inventory...how?
MOH Can Identify Malfunctions *Earlier* and Reduce Patient Re-visits

Number of Error Results, by Module

- A serious outlier
- Possible alert threshold

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

Error Results as Percentage of Total Results Reported

- **TBREACH-Abajigh**: 3.13%
- **TBREACH-Kujegh**: 7.08%
- **TBREACH-Kwali**: 13.70%
- **TBREACH-UATH**: 7.58%
- **Zankli Lab**: 4.63%

Opportunity to identify “best practices”

Focus attention where needed most

Possible alert threshold
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

- **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)
Better patient treatment
Faster response to MDR-TB
More efficient TB logistics

Prepared by:
Martha Benezet martha_benezet@abtassoc.com
Jeff Takle jeff_takle@abtassoc.com

Download slide deck @ www.GxAlert.com
Thank You!