Connectivity for Real-time Diagnosis to Manage TB, HIV, and COVID-19

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Objectives of the Meeting

- Introduction
- Primer - What is “Connectivity”?  
  - Connecting
  - Reporting
  - Confirming
- Vision of *Diagnostic Accountability*  
  - Viewing health system through lens of diagnostic network
- Positioned for COVID-19 Testing  
  - Strengthen TB Diagnostics and Prepare/Expand COVID testing
SystemOne ~ GxAlert ~ Many years experience in TB worldwide

7 Years
45 Countries
3,500+ GeneXpert Labs
10,000,000+ TB Results

Cepheid GeneXpert
Primer - What is “Connectivity”

1. CONNECT Instruments (Labs)
2. REPORT Results (Clinics)
3. CONFIRM Follow-up (Accounting)
Problem – Diagnostic Data is Stuck in Paper Form

INSIGHT—Treating disease on a national or global level is as much an information problem as it is a medical problem.

A local government supervisor copies lab results by hand from a local lab register to a district register.
A Primer on “Connectivity” - 1. CONNECT

Diagnostic Instrument
- Modem/Router
- SIM (Local v. Global)
  - Data Limits
  - Access Limits
- External antennas

The Internet
- In-Country Server
- Cloud version possible

Which is more secure?

GxAlert / Aspect Server
Connectivity is like turning on the lights

Connectivity Provides Transparency into Your Diagnostic Lab Network showing 2 kinds of data

**Clinical Data**
- Test Results
- Associated Patient Data
- Custom Data Fields
- Notes

**Operational Data**
- Utilization of Machines
- Service & Repair Coordination
- Cartridge Inventory Supply
- Errors & Performance
Bridging the Lab/Clinic Divide

Action On Results

Clinicians, Healthcare workers, Supervisors, Clients

Via SMS, email, Reporter App, SMS printer
Closing the Loop: Aspect Reporter App - 2. REPORT

Aspect Reporter App

- Send Results to clinics in real-time
- Allow clinics to confirm Tx
- Works online and offline
- Secured lab results
- Available at Google App Store
Result Reporting via Mobile App v. SMS or Email

- **Access limited** to those results only for facilities permitted to that person.
- **Securable** – password access required like bank app
- **Confirm receipt** of result delivery
- **Searchable** by patient name, date, type of test, etc.
- **Easy to use** (like most apps), requires little to no training or documentation.
- **Graceful Downgrade** to Email, SMS, or existing paper report if unworkable for some DOTS centers.
- **Expandable** to include other functions (recording samples have been collected, etc).
- **Works Offline** – for any results already downloaded.
The real value of “Connectivity” - 3. CONFIRM

Loss to Follow-up

High pretreatment LTFU has also been reported globally in TB

22–25% in South Africa (2010–12)
22% in India (2010–12 and 2015)
17% in Cameroon
38% in Ghana (2009)
20% in Zimbabwe (2018)*
Pretreatment Loss to Follow-up is significant and often unaccounted for.

**DX: Diagnostic**

**TX: Treatment**
Viewing Health System Through the Lens of Diagnostic Accountability

DX: Diagnostic

TX: Treatment

DIAGNOSTIC ACCOUNTABILITY
Leveraging Existing Diagnostic Platform for COVID-19 Testing
Aspect COVID-19 Module

Aspect COVID-19 Dashboard

Aspect Reporter
Mobile Application
COVID-19 Test Result
Analysis of 618 GeneXpert instruments across 8 countries reporting TB tests to GxAlert

Only 10% of instruments are reaching utilization rates of above 80%. 75% of instruments are performing at or below 50% utilization currently for TB testing.

Utilization rate calculation:
number of tests actually run per year/ theoretical maximum number of tests

Assumption: 3 TB tests per module, per day for 21 working days in month.
Are Countries ‘COVID-ready’?

New SARS-CoV-2 cartridge only operates on GeneXpert software version 4.7b or later

SystemOne analysis of 18 countries included 594 GeneXpert and categorized into those that require software upgrade (i.e. operating on version 4.7a or lower) and those that are ‘COVID-19 ready’ (i.e. those operating on version 4.7b or higher)

12.6% sites will require a software upgrade before commencing COVID-19 testing
Any Questions?

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