



# 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



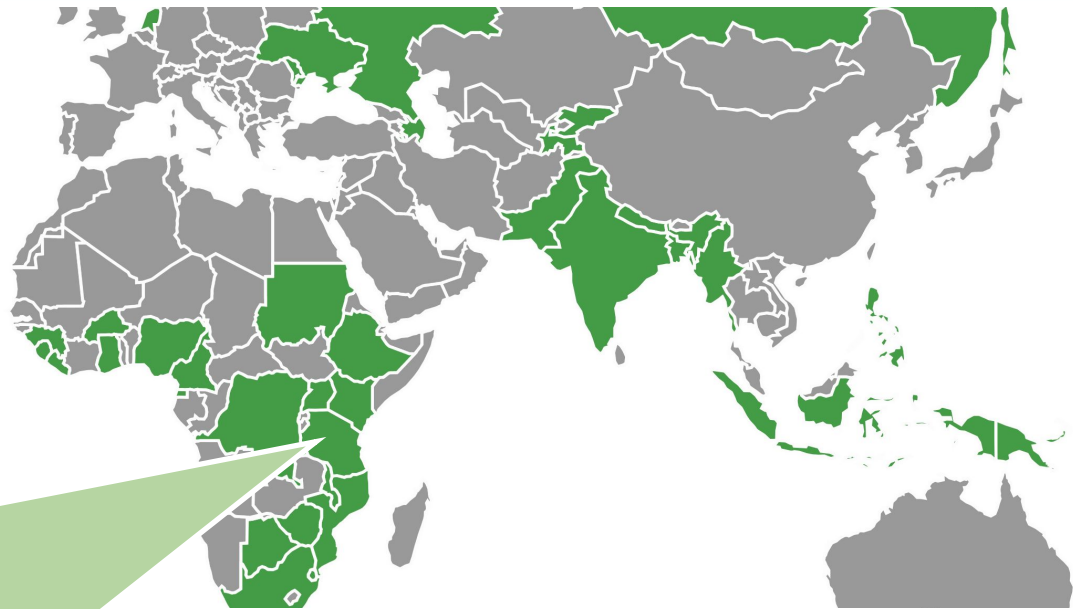
# SystemOne ~ GxAlert ~ Many years experience in TB worldwide

7 Years

45 Countries

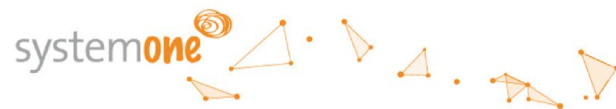
3,500+ GeneXpert Labs

10,000,000+ TB Results



Cepheid GeneXpert

## GxAlert



## 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 photograph showing two women sitting at a desk cluttered with various forms and papers. The woman on the left is wearing a bright green sleeveless top and is looking down at a document. The woman on the right is wearing a white pleated short-sleeved shirt and is using a green highlighter to mark a document. The documents are filled with tables and text, some with headings like 'OFFICE FLAT FILE' and 'NATIONAL CLINIC REGISTER'. The scene illustrates the manual process of transferring data from one form to another.

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**



..... **Dx** .....

**GxAlert / Aspect Server**



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

- In-Country Server
- Cloud version possible

Which is more secure?

# Connectivity is like turning on the lights

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



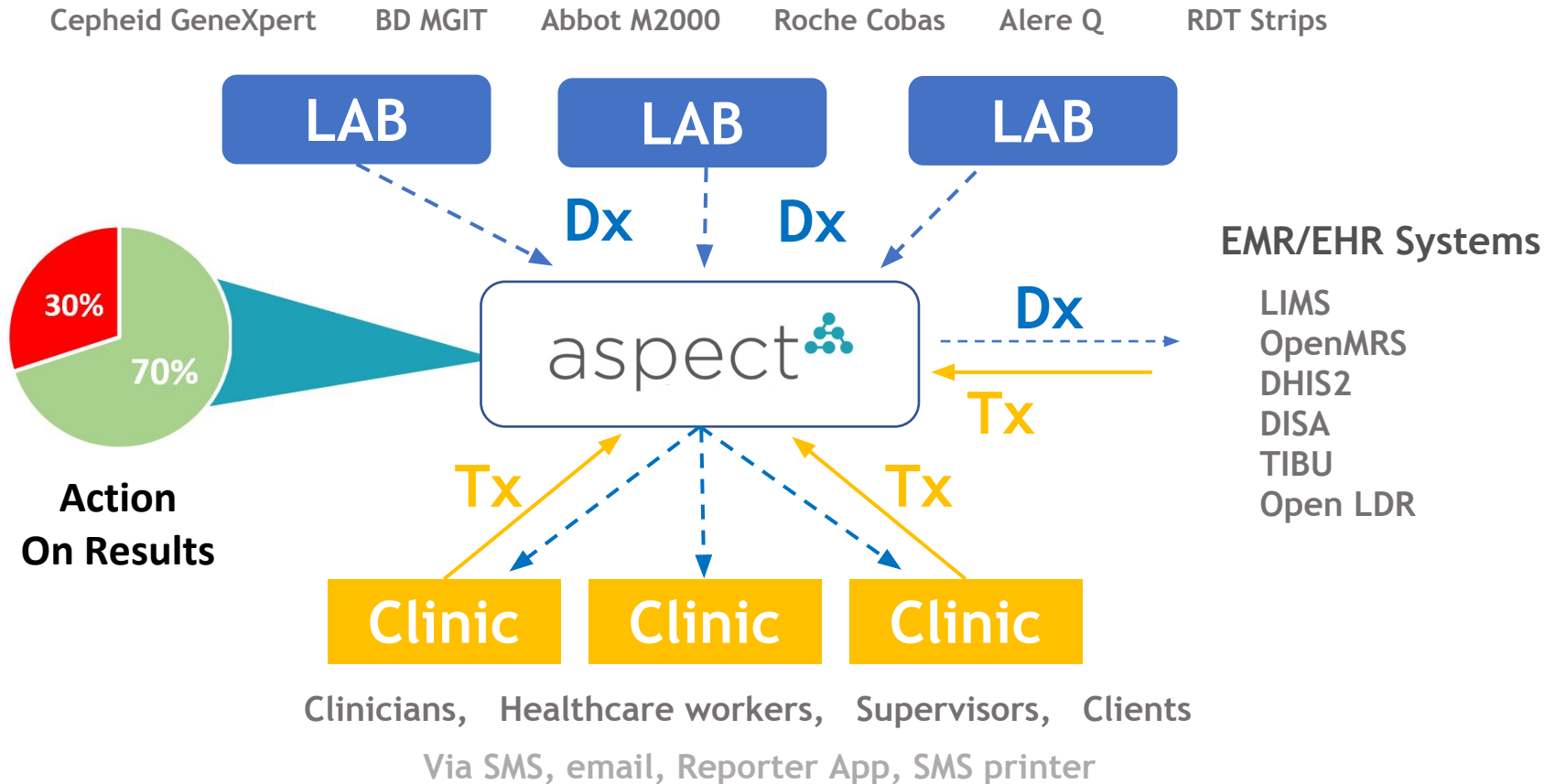
## Clinical Data

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

## Operational Data

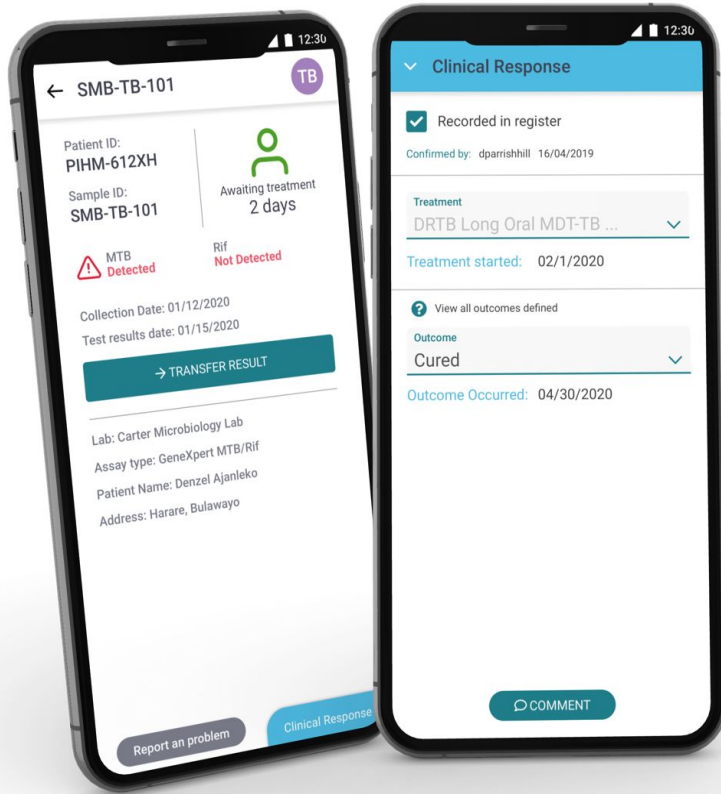
- Utilization of Machines
- Service & Repair Coordination
- Cartridge Inventory Supply
- Errors & Performance

# Bridging the Lab/Clinic Divide





# 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.



## 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)\*

**Diagnosis Dx**

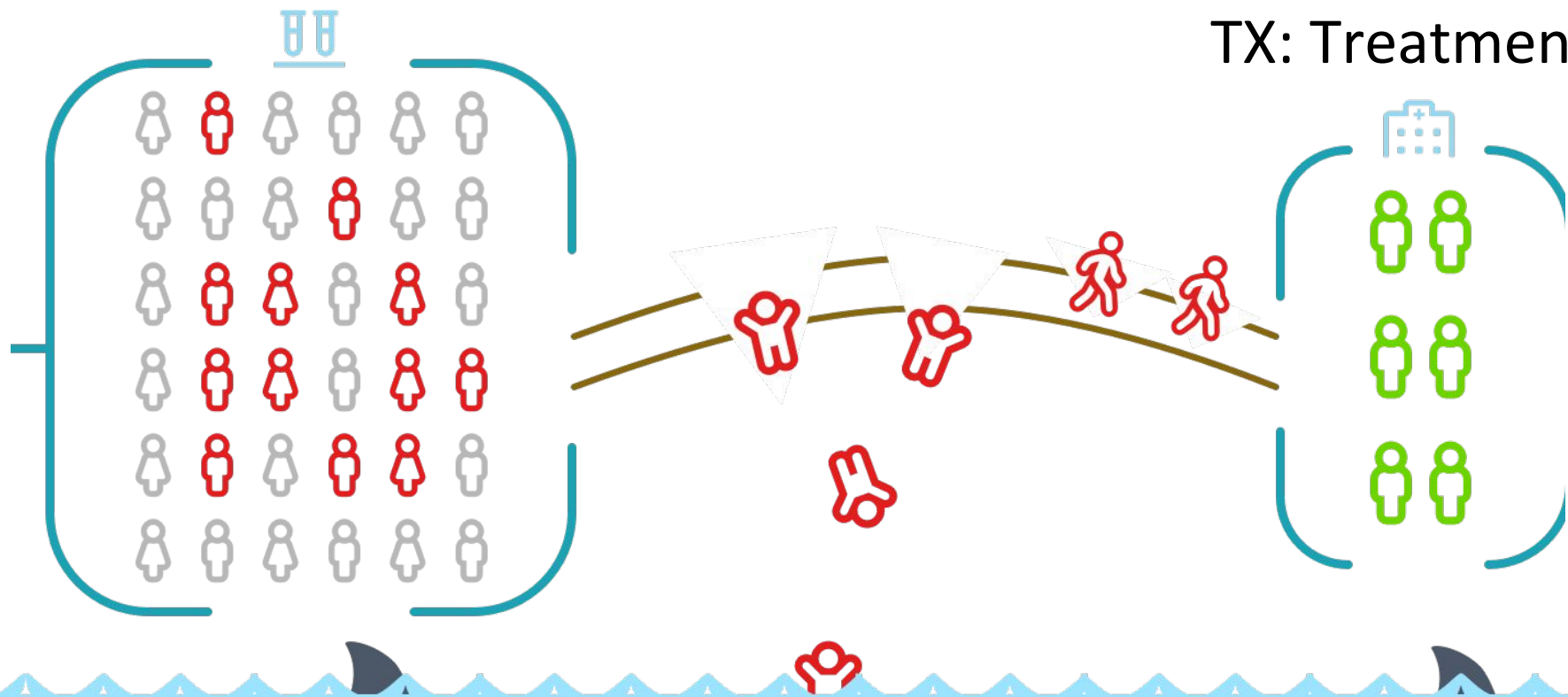
**Treatment Tx**



# Pretreatment Loss to Follow-up is significant and often unaccounted for

DX: Diagnostic

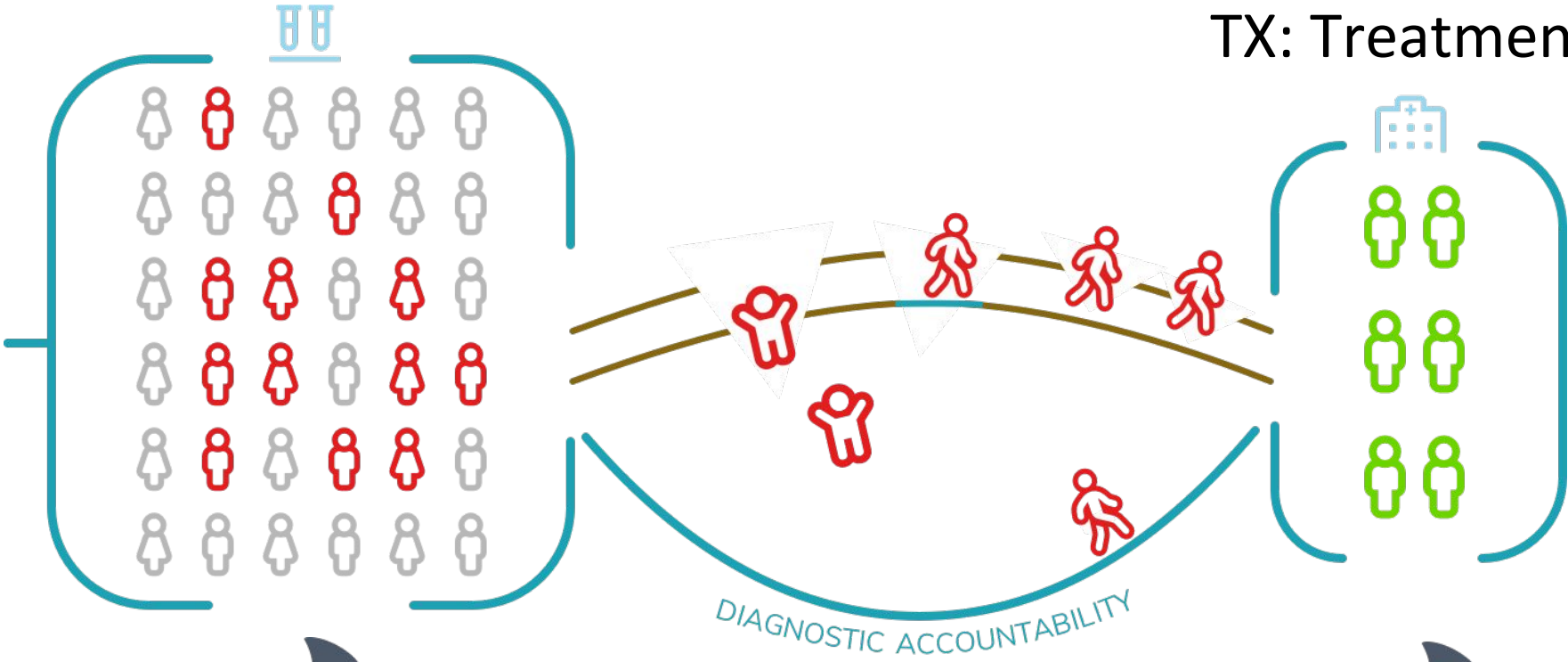
TX: Treatment



# Viewing Health System Through the Lens of Diagnostic Accountability

DX: Diagnostic

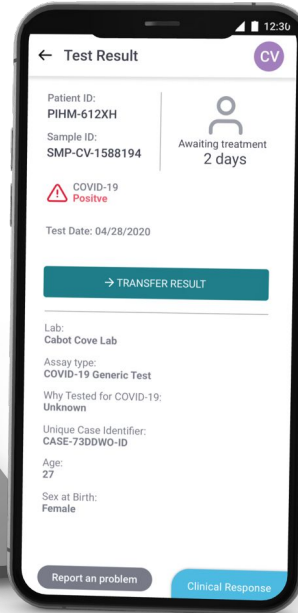
TX: Treatment



# Leveraging Existing Diagnostic Platform for COVID-19 Testing



# Aspect COVID-19 Module



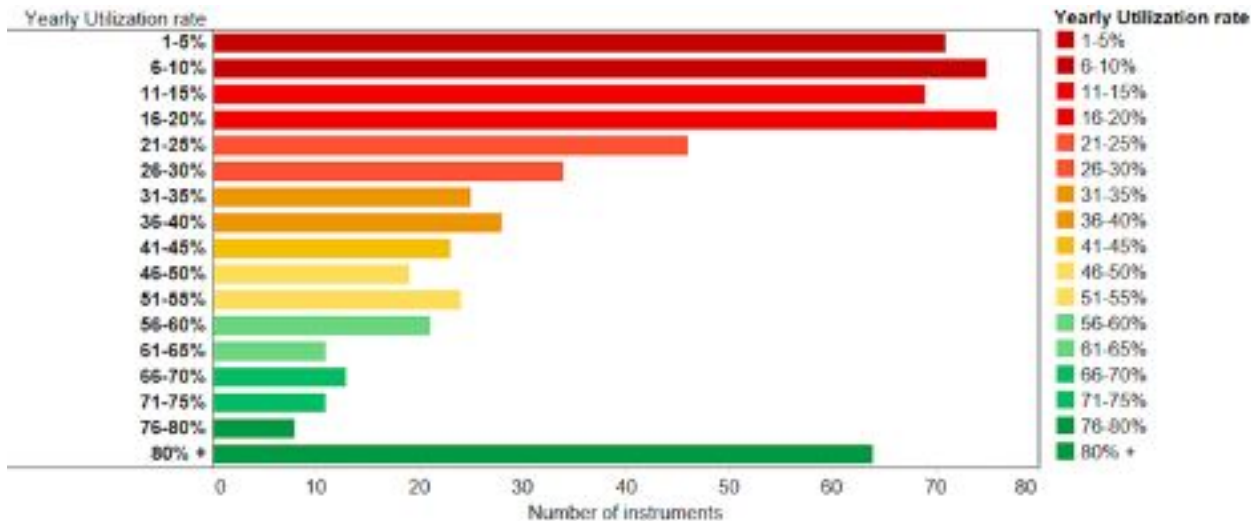
Aspect  
Reporter  
Mobile  
Application  
COVID-19 Test  
Result

Aspect COVID-19 Dashboard

# GeneXpert Fleet Capacity for COVID-19 Response

## 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



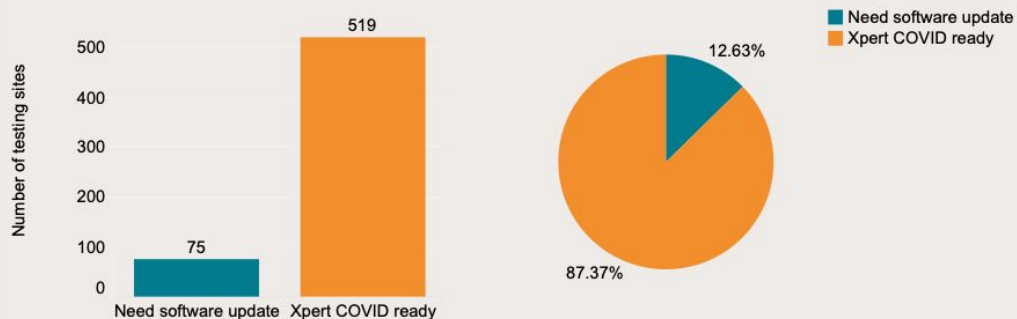
*Utilization rate calculation:*  
**number of tests actually run per year/ theoretical maximum number of tests**

Assumption: 3 TB tests per module, per day for 21 working days in month

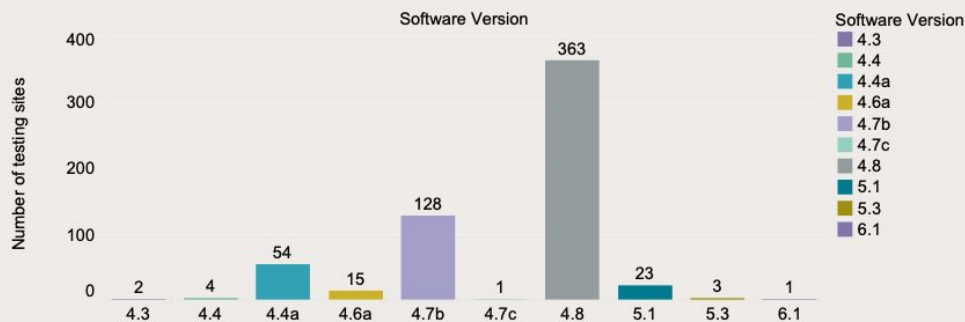


# Are Countries 'COVID-ready'?

## GeneXpert testing sites ready for COVID-19 testing (n=594)



## Breakdown of GeneXpert software versions



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 requires 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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