THE REPUBLIC OF UGANDA
MINISTRY OF HEALTH

UGANDA Supranational® Reference Laboratory

Timely Accurate Diagonostics for a TB-Free Africa

LABORATORY INFORMATION MANAGEMENT TRAINING

Module 4

Diagnostic connectivity solutions

SUPRANATIONAL REFERENCE LABORATORY, UGANDA

Module Objectives

- Explain the concept of diagnostic connectivity and how diagnostic connectivity solutions contribute to epidemiological surveillance

Diagnostic Connectivity Solutions

- Traditional diagnostics methods (e.g. smear microscopy and solid culture) typically require that a test result and associated patient details be manually written on paper, recorded in a register, and sent to the ordering clinician.
- Paper-based reporting is time consuming, and prone to transcription errors.

Diagnostic Connectivity Solutions…

- Newer diagnostics (e.g GeneXpert®, Bactec MGIT) produce results data in digital format (also known as electronic data).
- Unlike written data on paper, electronic data can be rapidly and accurately sent to different recipients according to relevance and utility and easily analysed.

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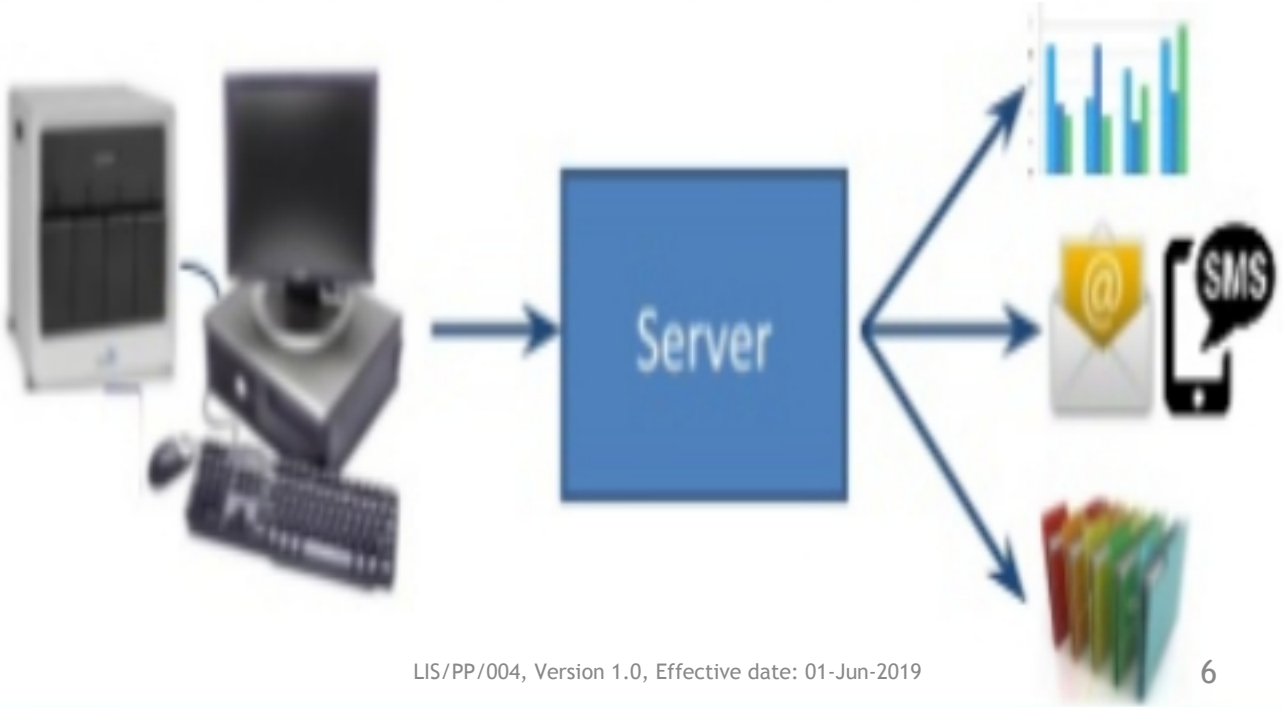
Diagnostic Connectivity Solutions…

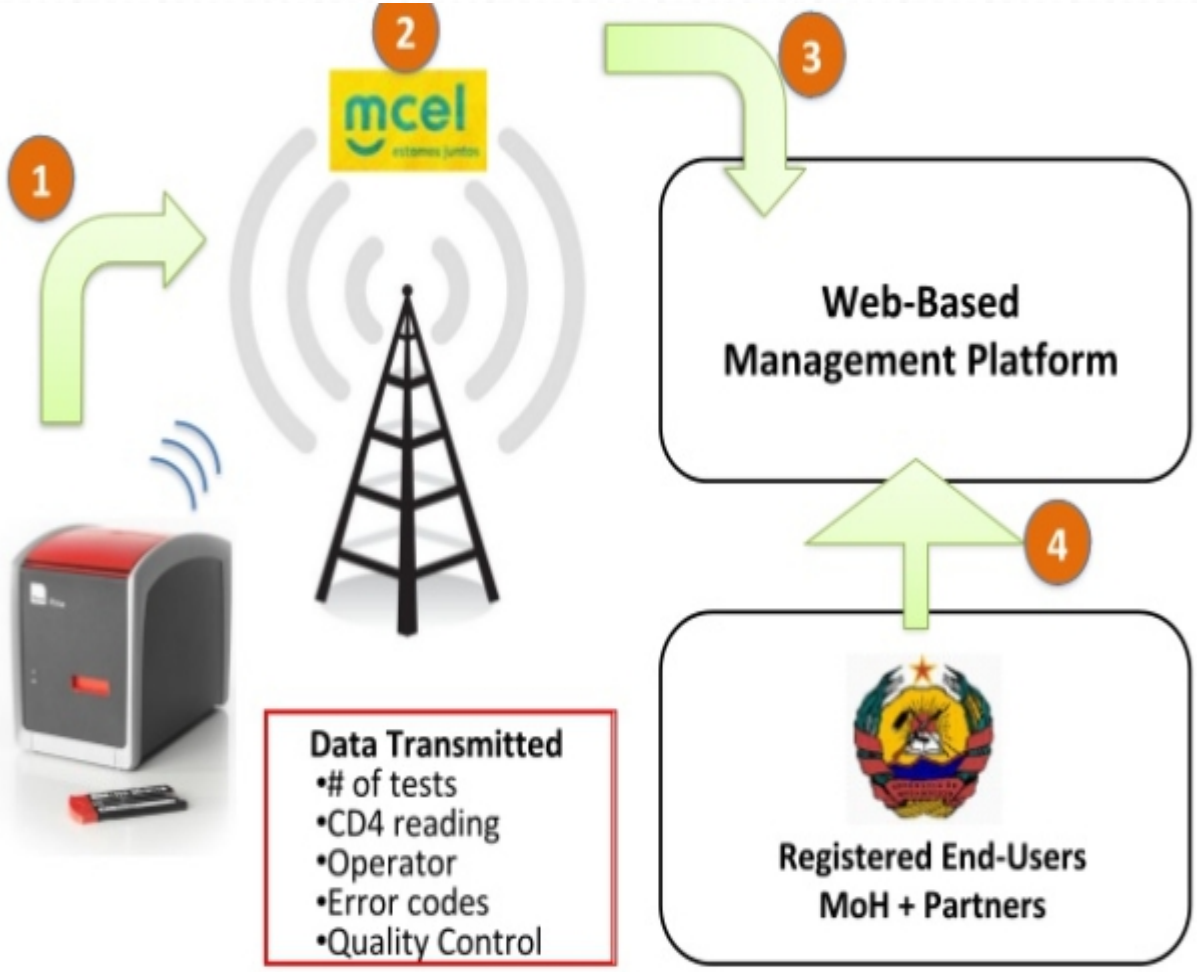
- Diagnostic Connectivity Solutions typically comprise of;
  - a connectable diagnostic device that produces electronic data
  - a software platform that receives and interprets data
  - a means to transmit data from the

Diagnostic Connectivity Solutions…

- Connectivity solutions facilitate the automatic transmission of electronic data to a variety of uses



Diagnostic Connectivity Solutions



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Why Diagnostic Connectivity Solutions?

- We want to quickly and easily monitor and manage the performance of the machines, and report results

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Why Diagnostic Connectivity Solutions?...

- According to the *WHO Framework of indicators and targets for laboratory strengthening under the End TB Strategy*;
  - All sites that use WHO-recommended rapid diagnostics should be transmitting results electronically to

Why Diagnostic Connectivity Solutions?...

- Remote monitoring via data connectivity solutions should be used to monitor key performance indicators at all sites that use WHO-recommended rapid diagnostics no later than 2020

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How can Diagnostic Connectivity Solutions be of use?...

- Remote monitoring and quality assurance
- Sending results automatically to clinicians
- Sending results to laboratory information management systems or electronic registers
- Inventory management
- Surveillance

How can Diagnostic Connectivity Solutions be of use?...

- Remote monitoring and quality assurance
  - Designated persons can use any internet-enabled computer to access the software platform, providing them with an overview of the facilities, devices and commodities in their network
    - For example: someone at a national reference laboratory can easily see how many tests are being performed and where, what are the results, and which sites are underperforming or experiencing abnormal results or errors

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How can Diagnostic Connectivity Solutions be of use?...

- Remote monitoring and quality assurance
- Sending results automatically to clinicians
  - Test results can automatically and instantly upon result availability be sent to a clinician's phone or email, SMS printer or other clinical results reporting mechanism, allowing for faster patient follow-up
    - A text message could also be sent to a patient, informing when their test results are ready and instructing them to visit the clinician to receive them

How can Diagnostic Connectivity Solutions be of use?...

- Remote monitoring and quality assurance
- Sending results automatically to clinicians
- Sending results automatically to laboratory information management systems or electronic registers
  - Test results can be automatically integrated into laboratory information management systems or electronic registers, reducing staff time and the chance of transcription errors, and greatly facilitating M&E processes

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How can Diagnostic Connectivity Solutions be of use?...

- Remote monitoring and quality assurance
- Sending results automatically to clinicians
- Sending results automatically to laboratory information management systems or electronic registers
- Inventory management
  - Stocks can be entered at site-level and anticipated stock-out date or potential expiring cartridges can be forecast
  - Tracking of lot numbers can identify poor performance and abnormal error rates for quality assurance purposes

How can Diagnostic Connectivity Solutions be of use?...

- Remote monitoring and quality assurance
- Sending results automatically to clinicians
- Sending results automatically to laboratory information management systems or electronic registers
- Inventory management
- Surveillance
  - Real-time data and trends on disease or resistance patterns can be easily discerned using data from the network of devices

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How can Diagnostic Connectivity Solutions be of use?...

- Remote monitoring and quality assurance
- Sending results automatically to clinicians
- Sending results automatically to laboratory information management systems or electronic registers
- Inventory management
- Surveillance
- Data access
  - Subsets of data can be shared with partners or manufacturers

What is needed for Diagnostic Connectivity Solutions

Software

- Connectivity software platforms have been developed by diagnostics manufacturers as well as by third-party companies and organizations
- The selection of software depends on the needs and preferences of the Ministry of Health and may depend on:
  - functionalities of different systems
  - range of devices or languages supported
  - experience and capacity of the provider and implementing partners
  - data security measures and/or hosting arrangements in place
- Software may have complementary functionalities, justifying implementation and use of more than one system

What is needed for Diagnostic Connectivity Solutions…

Hardware

- Server
  - In-country, or 3rd party (cloud-based)
    - See slide on Hosting options, later in module
- Modem
  - Standalone desktop modems (also known as smart routers) are generally the best quality option but are more expensive
    - External antennas may provide stronger connection
  - USB internet dongles may be an option, but they carry the risk of being removed, misplaced and misused.

What is needed for Diagnostic Connectivity Solutions

Server

- There are two options for hosting of data collected:
  - Direct hosting using an in-country server
    - Requires adequate infrastructure, financial resources, and IT personnel to configure and maintain the server
  - 3rd party hosting (also known as: virtual or cloud-based servers)
    - Highly secure, provide redundancy against data loss, are quickly scalable and are a good option when a country does not have the IT capacity to properly configure and maintain an in-country server
    - Generally a cheaper option

What is needed for Diagnostic Connectivity Solutions

- Internet Connectivity

- The data plan (measured in Megabytes-MB or Gigabytes-GB) should be sufficient to allow the transmission of data from all connected devices to the server. The data plan should also be sufficient to allow updates of anti-virus software

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Ensuring Impact from a Diagnostic Connectivity Solutions

- Integration
  - Integration of diagnostics connectivity solutions with multiple types of diagnostics and with other databases (LIMS and electronic registers) allows

Ensuring Impact from a Diagnostic Connectivity Solutions…

- Sharing costs and responsibilities with other programmes = sustainability

Exercise

1. Explain the concept of diagnostic connectivity and how diagnostic connectivity solutions contribute to patient care and epidemiological surveillance

References

- GLI Quick Guide to TB Diagnostics Connectivity Solutions
- WHO/ERS. Digital health for the End TB Strategy: an agenda for action 2015
- WHO Guide on Electronic Recording and Reporting for Tuberculosis Care and Control

Acknowledgments

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