

# Training on Tuberculosis Drug and Susceptibility Testing (MGIT DST – Liquid Method)

## Module 2: Epidemiology of Tuberculosis

**Date:**

**Uganda Supranational Reference  
Laboratory**

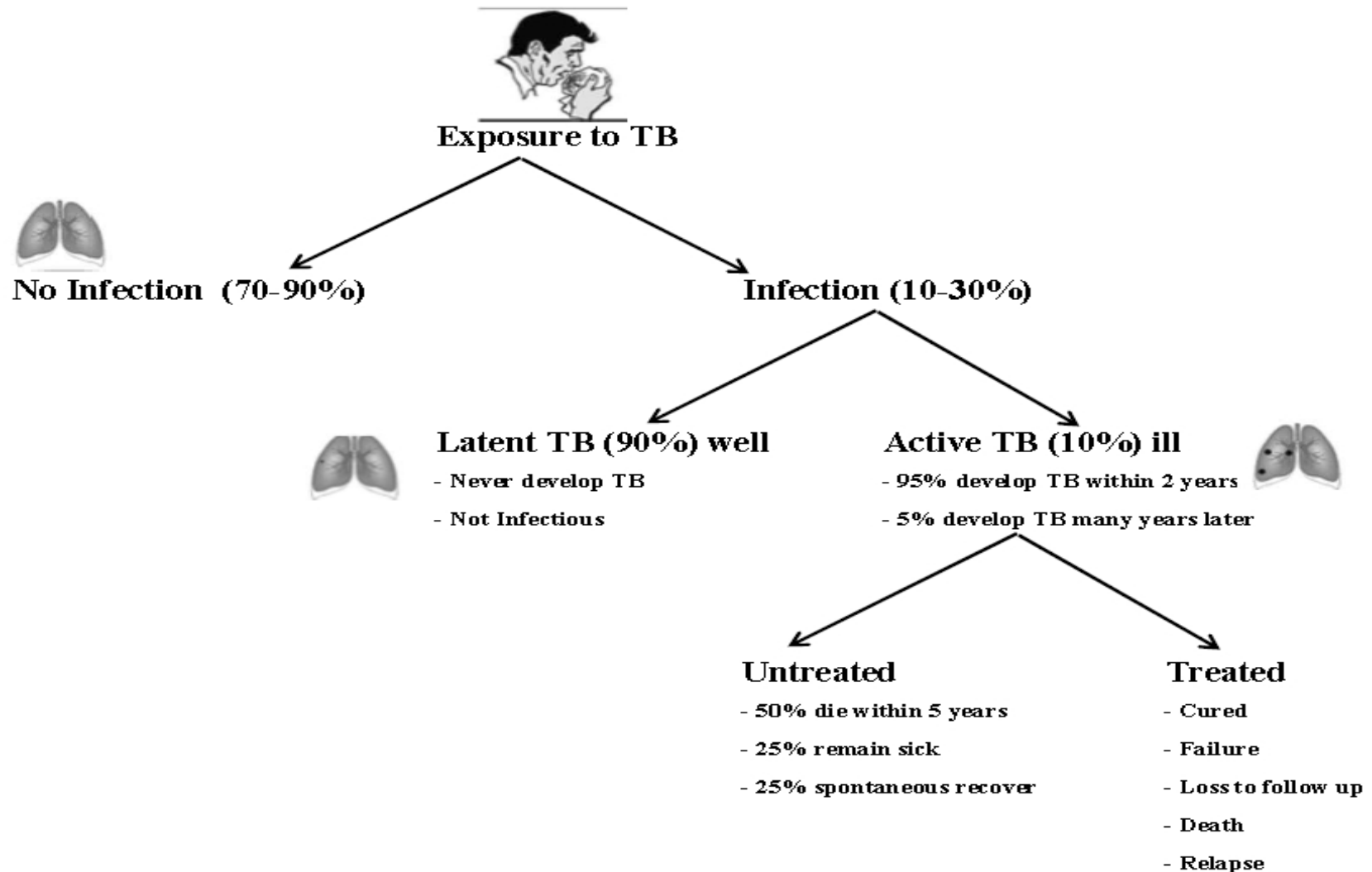
# Module Outline

- What is TB and its causative agent.
- Natural history of TB
- How is TB transmitted
- Risk factors associated with Tuberculosis Infection
- Global and national burden Tuberculosis infection
- Organization of TB laboratory services

# What is TB

- Main cause of TB: MTB bacteria
- But, not all MTB infected people are developing to “Active TB”
- TB is an infectious disease that affects mainly the lungs (pulmonary TB, or PTB) but can also attack any part of the body (extra pulmonary TB, or EPTB)

# Natural History of TB



# TB DISEASE

Active infection- person excreting tubercle bacilli in sputum, and has other signs and symptoms of TB such as cough > 2 weeks, fever, loss of weight

📖 **A “TB suspect”**- a person presenting with cough for more than 2 weeks

📖 **A “TB case”**- A person who has been diagnosed by a clinician or confirmed bacteriologically as having TB

# ACTIVE TB

Active infection- person excreting tubercle bacilli in sputum, and has other signs and symptoms of TB such as cough > 2 weeks, fever, loss of weight

📖 **A “Presumptive TB Case”**- a person presenting with cough for more than 2 weeks

📖 **A “TB case”**- A person who has been diagnosed by a clinician or confirmed bacteriologically as having TB



# Group Exercise

Describe 5 risk factors that can pre-dispose an individual to TB infection.

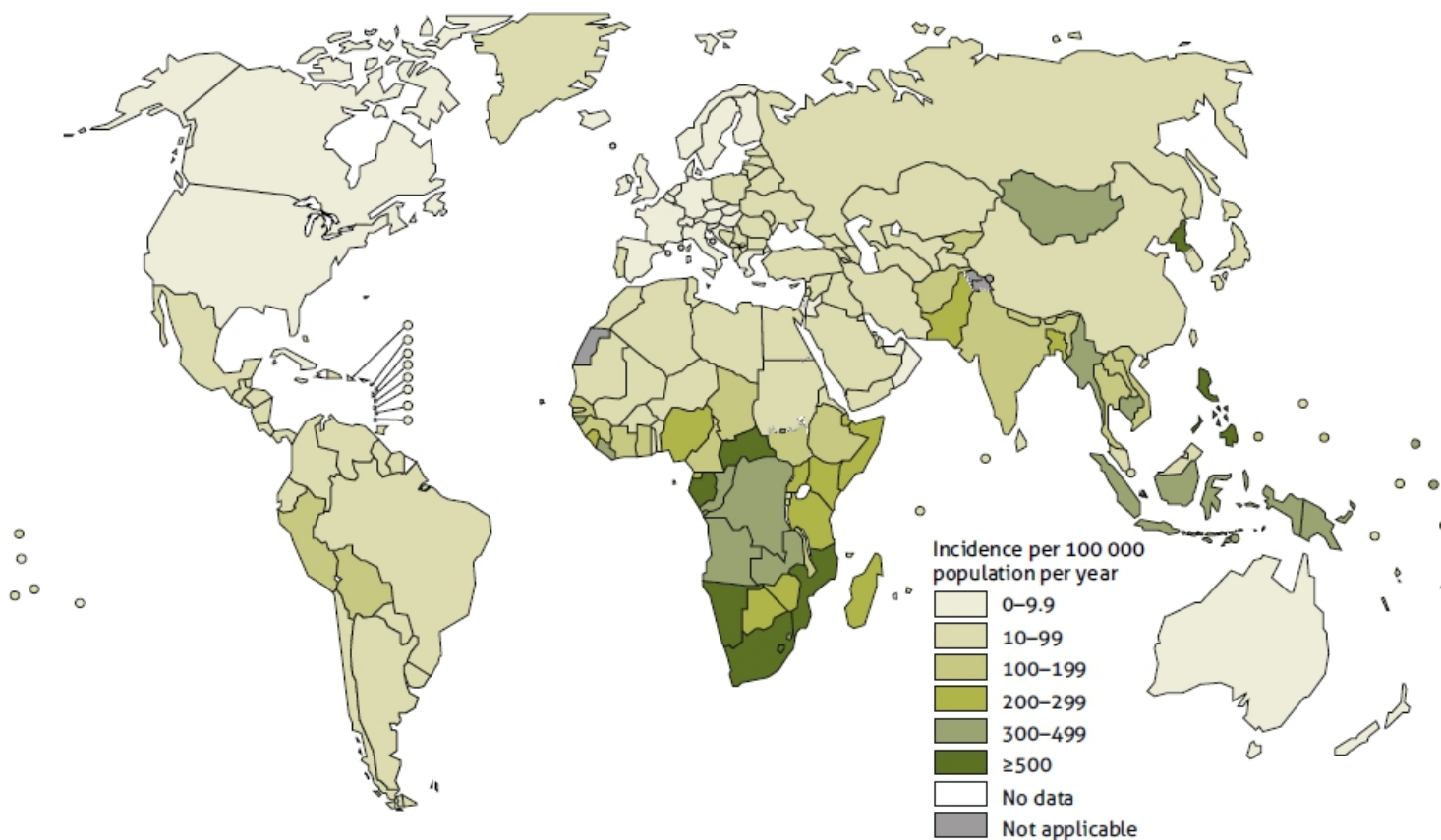
# Causative agent of TB

- *Mycobacterium tuberculosis*
- *Mycobacterium bovis*



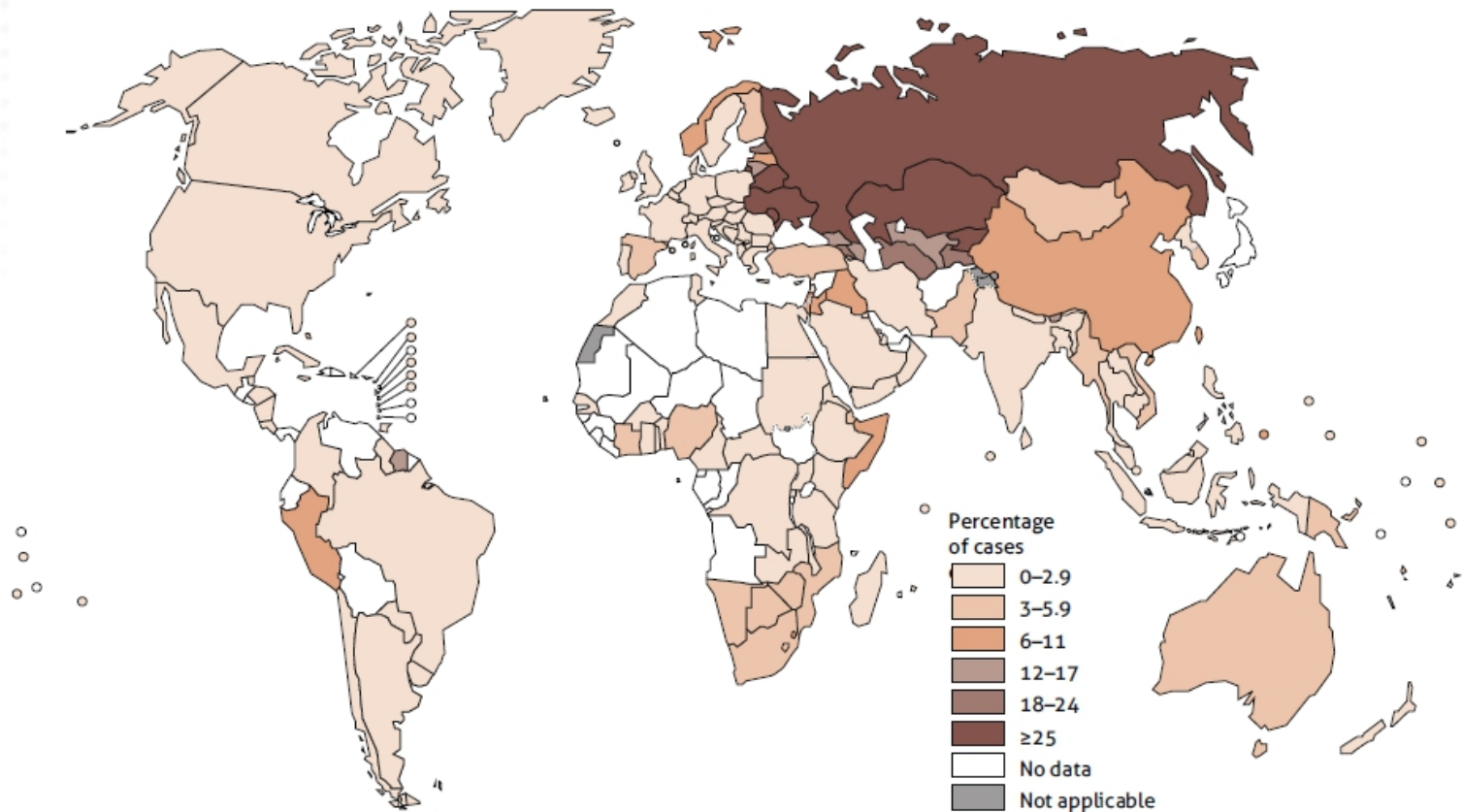
# GLOBAL TB BURDEN

Estimated TB incidence rates, 2018



# MDR/RR TB GLOBAL SITUATION

Percentage of new TB cases with MDR/RR-TB<sup>a</sup>

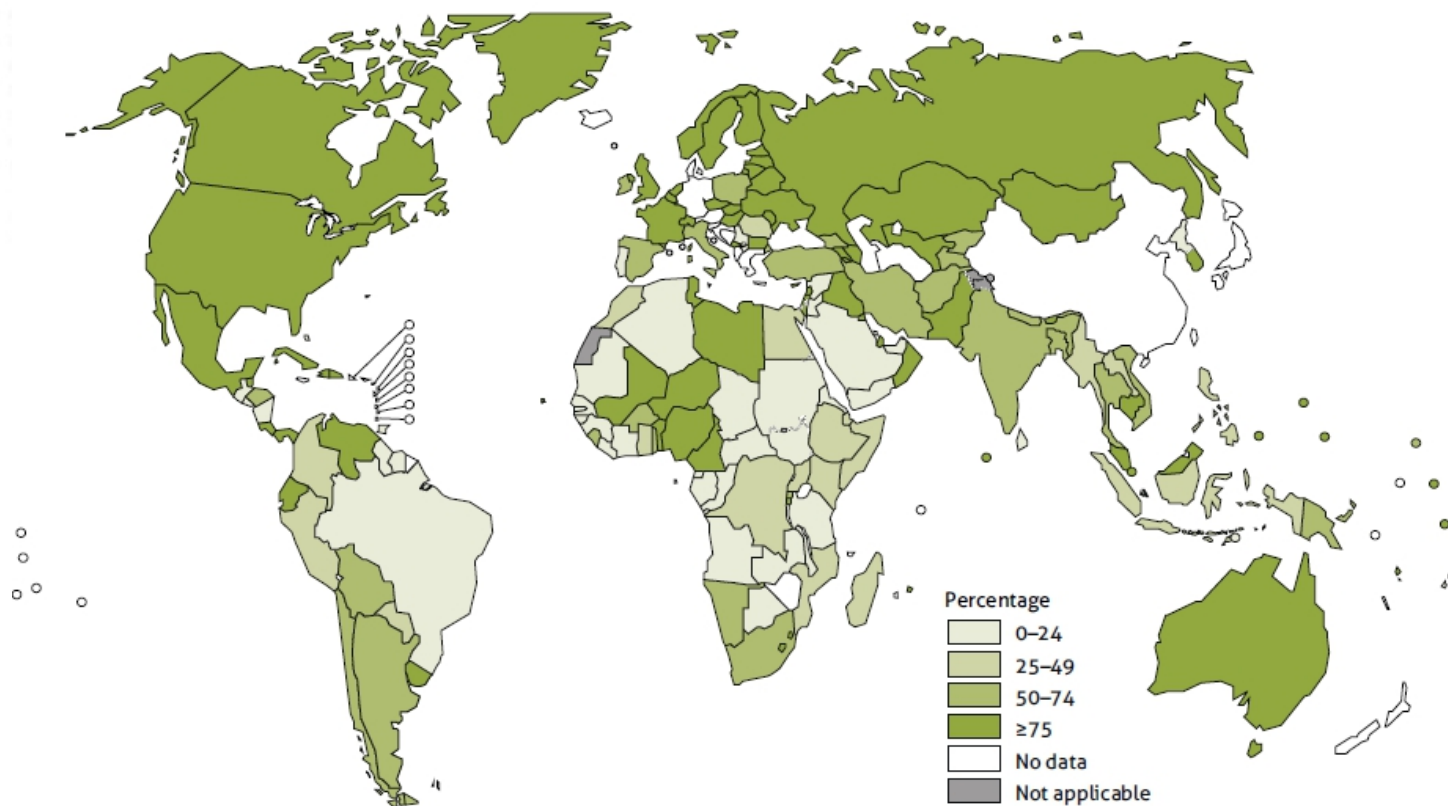


<sup>a</sup> Percentages are based on the most recent data point for countries with representative data from 2004 to 2019. Model-based estimates for countries with data before 2004 are not shown. MDR-TB is a subset of RR-TB.



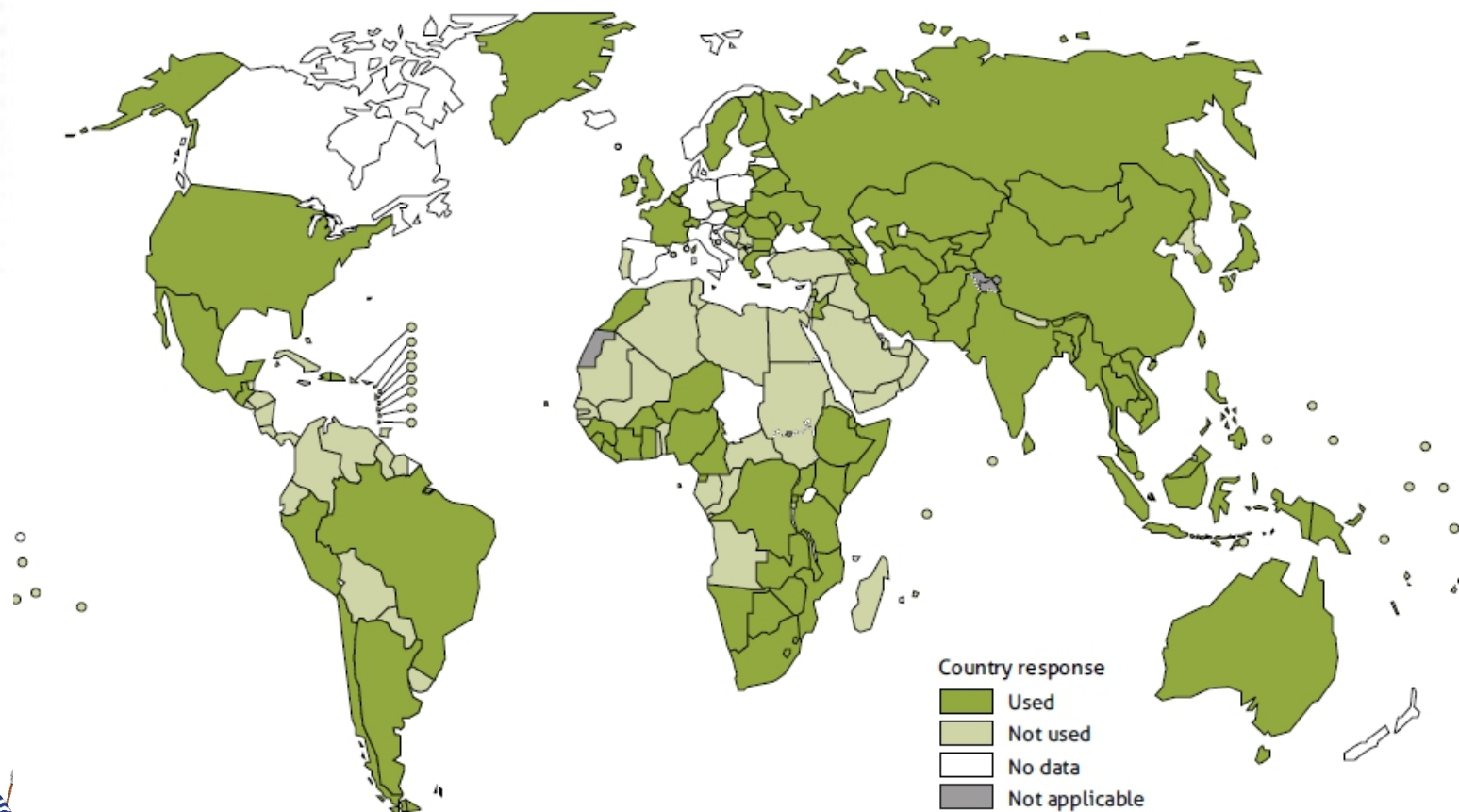
# MDR/RR-TB GLOBAL BURDEN

Percentage of MDR/RR-TB cases tested for susceptibility to second-line drugs, 2018



# USE OF BDQ FOR MDR/XDR-TB: GLOBAL SITUATION

Countries that used bedaquiline for the treatment of MDR/XDR-TB as part of expanded access, compassionate use or under normal programmatic conditions by the end of 2018

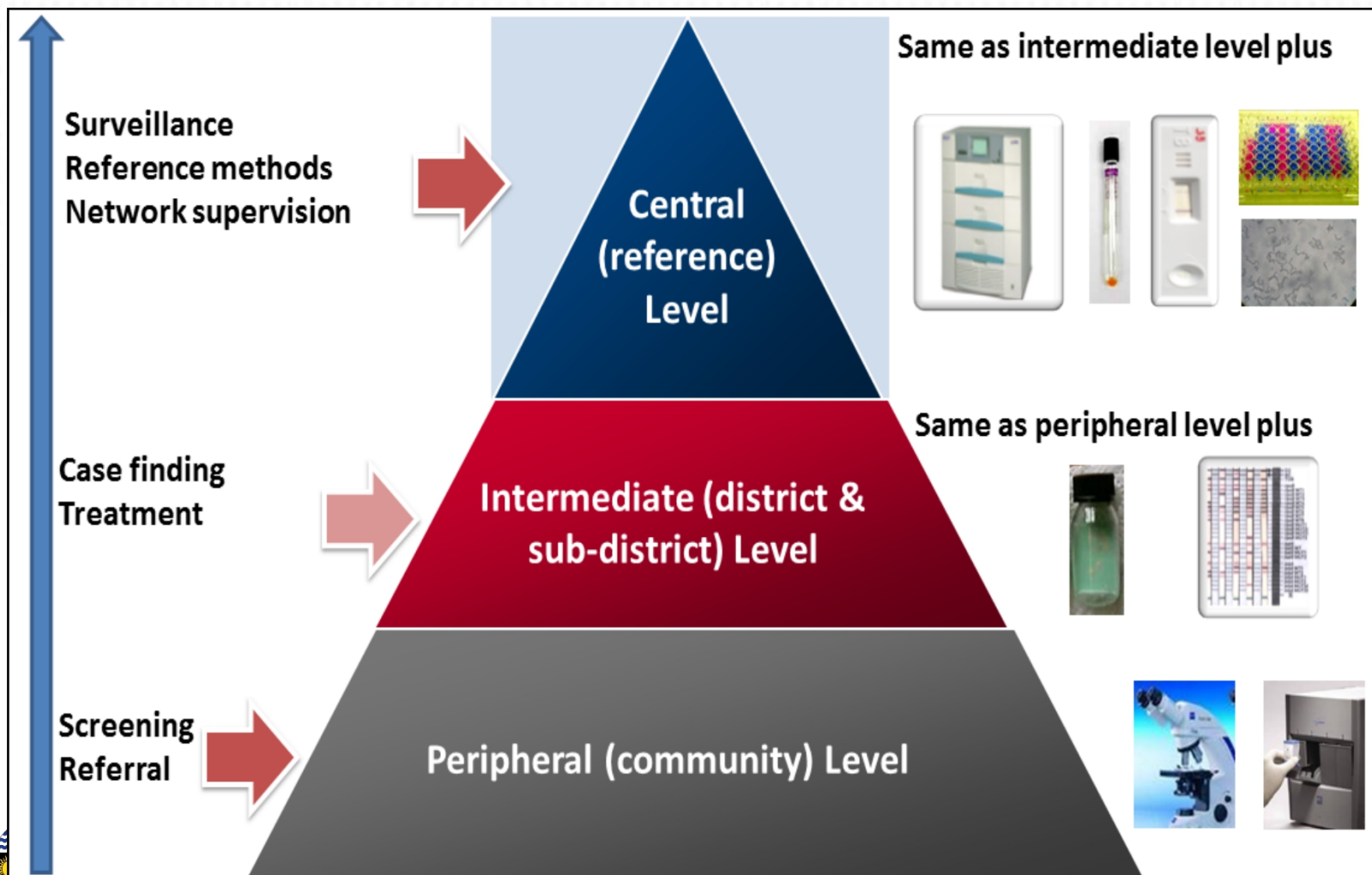




# TB BURDEN IN UGANDA

- Estimated TB incidence (2016): 234 cases/100,000 population
- Estimated TB Prevalence (2016): 253 cases/100,000 population

# TB Laboratory Network





# PERIPHERAL LABORATORY

## Peripheral laboratories:

- Are located within a general dispensary, clinic or hospital
- Have limited services for TB diagnosis that may include
  - Sputum specimen collection
  - Sputum-smear microscopy
  - Xpert MTB/RIF testing

Should participate in external quality assurance (EQA) programmes

# INTERMEDIATE LABORATORY

## Intermediate laboratories:


Are in regional or large hospitals

🌐 Have expanded services for TB diagnosis that may include

- Sputum specimen collection
- Sputum-smear microscopy
- Xpert MTB/RIF testing
- Culture and identification of *M. tuberculosis*
- LPA

# INTERMEDIATE LABORATORIES

- **Intermediate Laboratories:**

-  Provide support for peripheral laboratories in terms of;

- Supply of reagents and materials

- Offer training, supervision, EQA of sputum-smear microscopy and Xpert MTB/RIF testing.

# NATIONAL/CENTRAL LABORATORY

## Central laboratories:

- Are at the country, provincial or state level
- Provide comprehensive services for TB diagnosis that may include
  - Sputum specimen collection
  - Sputum-smear microscopy
  - Xpert MTB/RIF testing
  - LPA
- Culture and identification of *M. tuberculosis*

DST for first-line and second-line anti-TB agents

# NATIONAL/CENTRAL LABORATORY

## National/Central Laboratories;

Provide support for the laboratory network

- Organizing and participating in training, providing supervision and EQA of sputum-smear microscopy, Xpert MTB/RIF testing and culture; offering advice on procurement
- Engage in other activities
- Participate in operational research, drug-resistance surveillance

# ASSESSMENT

- What is TB and how it is transmitted?
- What is the difference between Active and Latent TB?
- Give five risk factors that predispose an individual to TB?
- What is the role of TB laboratories?



# Summary

- TB is an infectious disease that mainly affects the lungs but can affect any part of the body.
- Being HIV-positive, smoking, DM, malnourished, pregnant increases the risk of developing TB disease: people coinfected with HIV and TB have a 10% annual risk of developing active TB.
- The TB laboratory network plays a critical role in TB control, and is generally organized into 3 levels: central, intermediate and peripheral. Each level has well defined technical or managerial tasks, or both.



# References

- GLI TB training package  
<http://www.stoptb.org/wg/gli/trainingpackages.asp>

# Acknowledgement

