
THE REPUBLIC OF UGANDA
MINISTRY OF HEALTH

UGANDA Supranational® Reference Laboratory

*Timely Accurate Diagonostics for a TB-Free Africa*

# Training on *Mycobacterium tuberculosis* drug susceptibility testing (first and second line LJ DST)

## Module 2: Epidemiology of Tuberculosis

**Venue:**

**Presenter:**

**Date:**

# Module Outline

- Introduction
- Learning Objectives
- Course Content
  - 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
- Assessment
- Summary
- References

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# Introduction

- Tuberculosis (TB) is a communicable disease that is a major cause of ill health and one of the leading causes of death worldwide.
- Until the coronavirus (COVID-19) pandemic, TB was the leading cause of death from a single infectious agent, ranking above HIV/AIDS.

# Learning Objectives

At the end of this presentation , the learner should be able to:

- Describe the natural history of TB disease
- Understand the underlying risk factors to TB infection
- Appreciate the current WHO Global and national TB burden

# 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

Exposure to TB

No Infection (70-90%)

Infection (10-30%)

Latent TB (90%) well

- Never develop TB
- Not Infectious

Active TB (10%) ill

- 95% develop TB within 2 years
- 5% develop TB many years later

Untreated

- 50% die within 5 years
- 25% remain sick
- 25% spontaneous recover

Treated

- Cured
- Failure
- Loss to follow up
- Death
- Relapse

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# 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 2weeks
- **A "TB case"-** A person who has been diagnosed by a clinician or confirmed bacteriologically as having TB

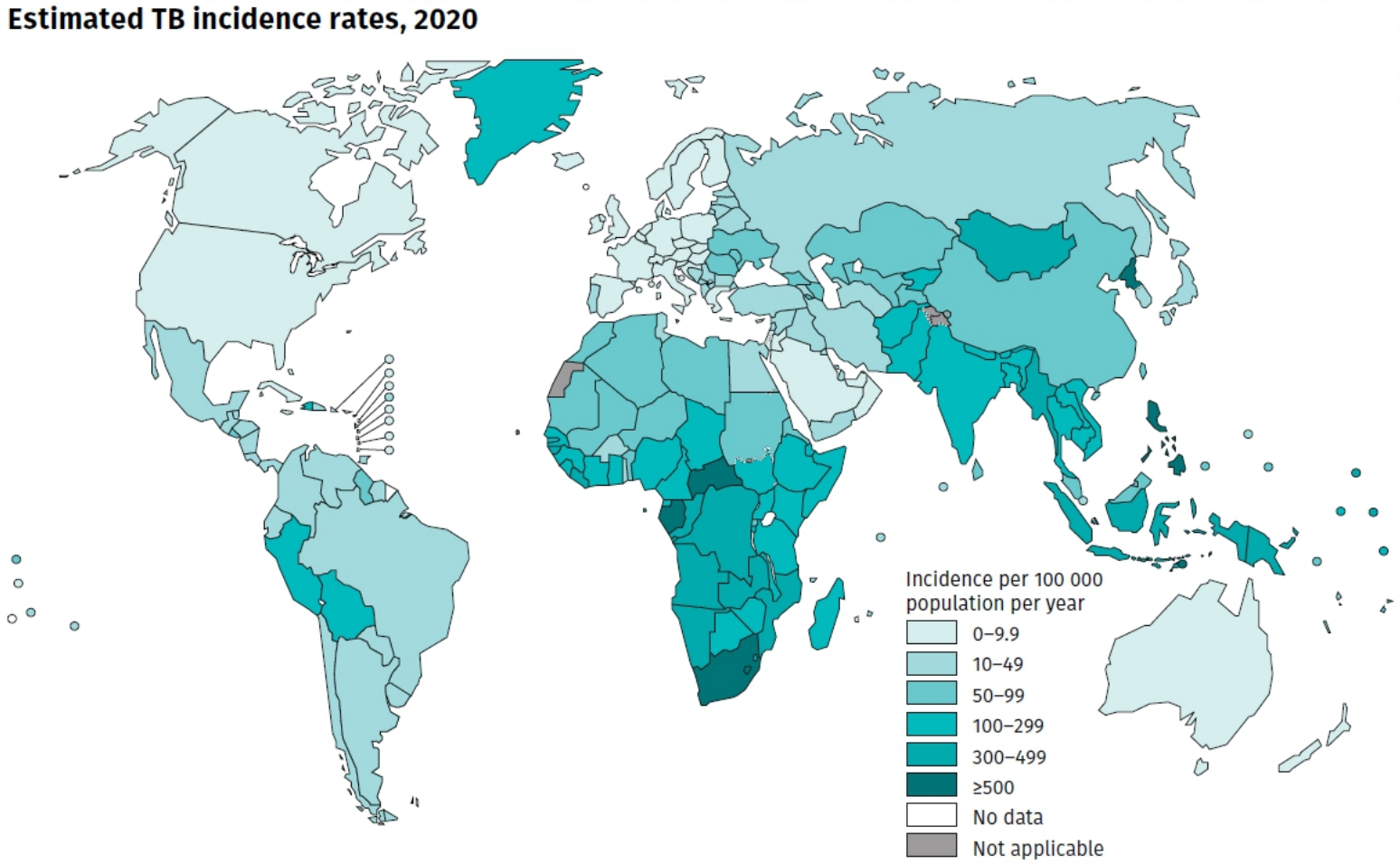
# Group Exercise

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

# Causative agent of TB

- Mycobacterium tuberculosis
- Mycobacterium bovis

# GLOBAL TB BURDEN

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## Countries in the three global lists of high-burden countries for TB, HIV-associated TB and MDR/RR-TB to be used by WHO in the period 2021–2025.

The red square indicates that a country is in a list.

| COUNTRY | TB | TB/HIV | MDR/ RR-TB |
|---|---|---|---|
| Angola | ■ | | ■ |
| Azerbaijan | | | ■ |
| Bangladesh | ■ | | ■ |
| Belarus | | | ■ |
| Botswana | | ■ | |
| Brazil | ■ | ■ | |
| Cameroon | | ■ | |
| Central African Republic | ■ | ■ | |
| China | ■ | ■ | ■ |
| Congo | ■ | ■ | |
| Democratic People's Republic of Korea | ■ | | ■ |
| Democratic Republic of the Congo | ■ | ■ | ■ |
| Eswatini | | ■ | |
| Ethiopia | ■ | ■ | |
| Gabon | ■ | ■ | |
| Guinea | | ■ | |
| Guinea-Bissau | | ■ | |
| India | ■ | ■ | ■ |
| Indonesia | ■ | ■ | ■ |
| Kazakhstan | | | ■ |
| Kenya | ■ | ■ | |
| Kyrgyzstan | | | ■ |
| Lesotho | ■ | ■ | |
| Liberia | ■ | ■ | |
| Malawi | | ■ | |
| Mongolia | ■ | | ■ |
| Mozambique | ■ | ■ | ■ |
| Myanmar | ■ | ■ | ■ |
| Namibia | ■ | ■ | |
| Nepal | | | ■ |
| Nigeria | ■ | ■ | ■ |
| Pakistan | ■ | | ■ |
| Papua New Guinea | ■ | | ■ |
| Peru | | | ■ |
| Philippines | ■ | ■ | ■ |
| Republic of Moldova | | | ■ |
| Russian Federation | | ■ | ■ |
| Sierra Leone | ■ | | |
| Somalia | | | ■ |
| South Africa | ■ | ■ | ■ |
| Tajikistan | | | ■ |
| Thailand | ■ | ■ | |
| Uganda | ■ | ■ | |
| Ukraine | | | ■ |
| United Republic of Tanzania | ■ | ■ | |
| Uzbekistan | | | ■ |
| Viet Nam | ■ | | ■ |
| Zambia | ■ | ■ | ■ |
| Zimbabwe | | ■ | ■ |

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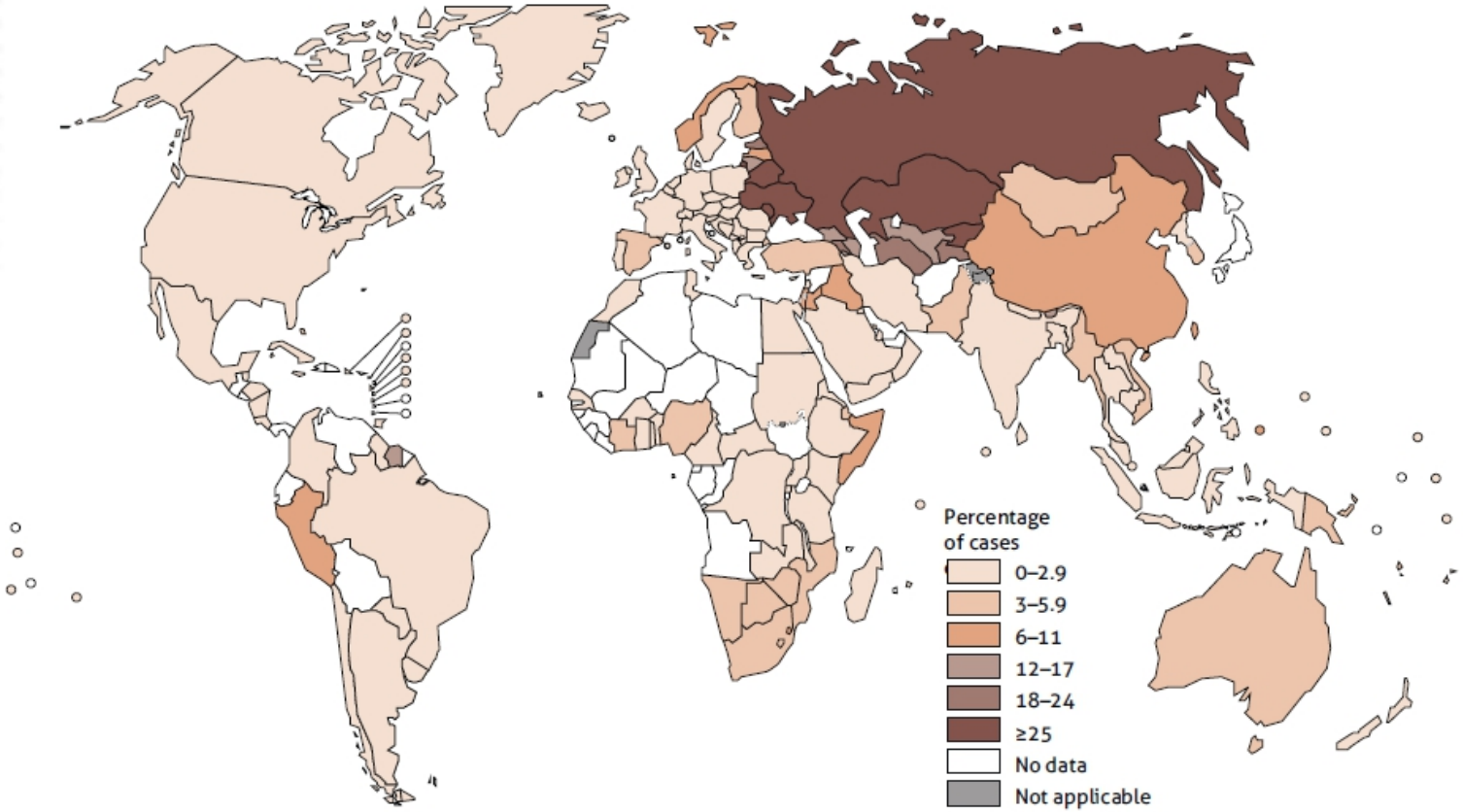
# MDR/RR TB GLOBAL SITUATION

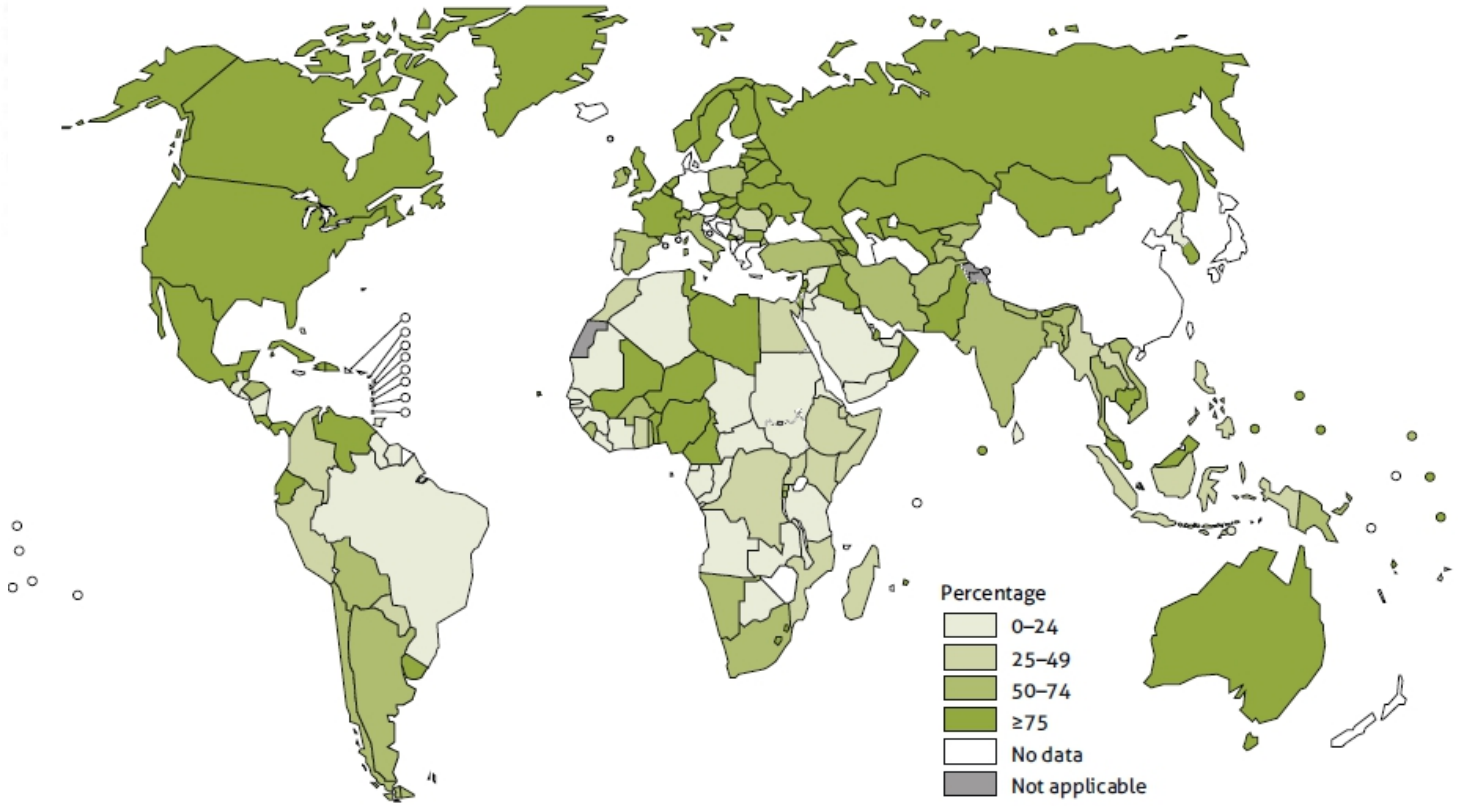
**Percentage of new TB cases with MDR/RR-TB[a]**




[a] 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

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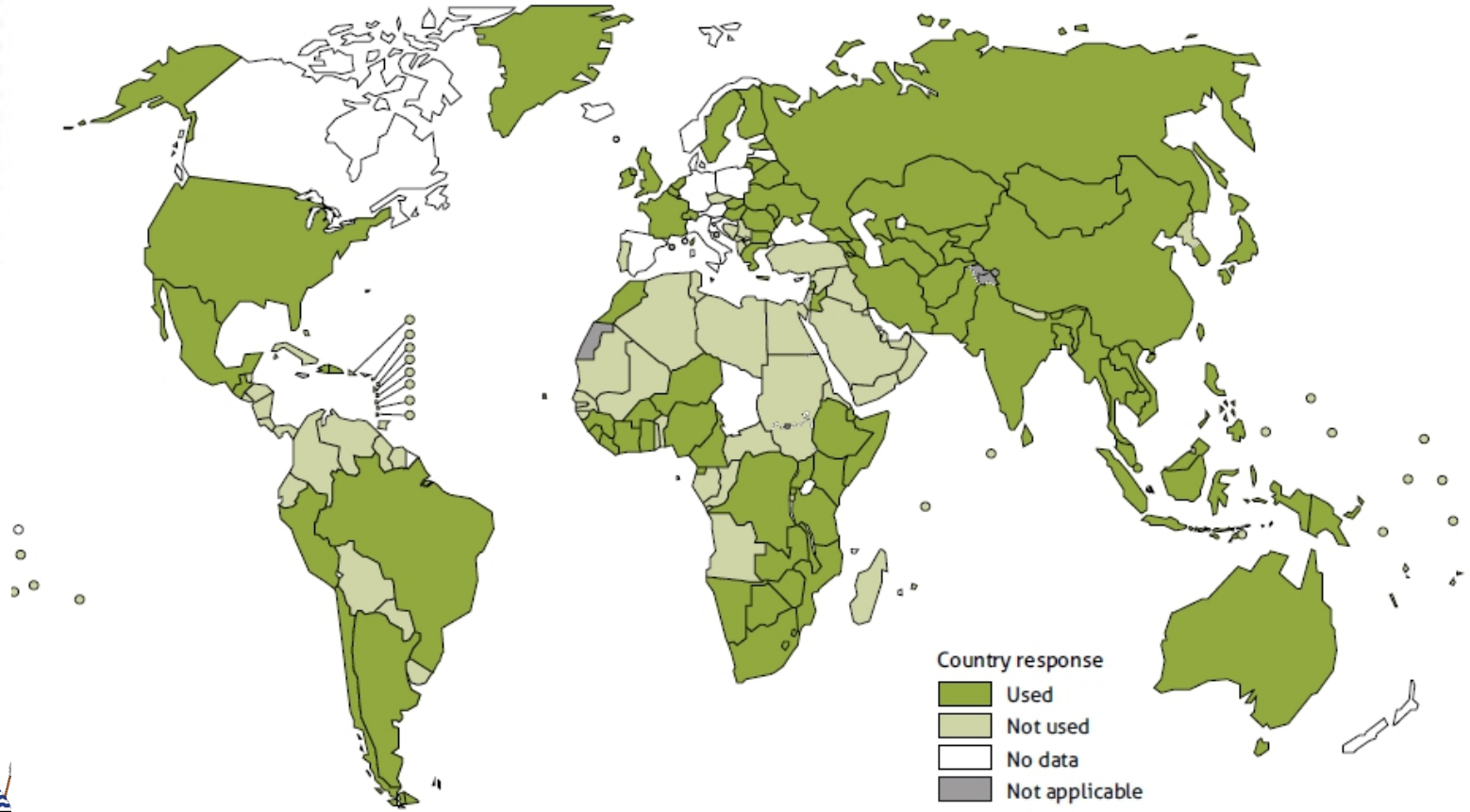
# USE OF BDQ FOR MDR/XDR-TB: GLOBAL SITUATION

**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**

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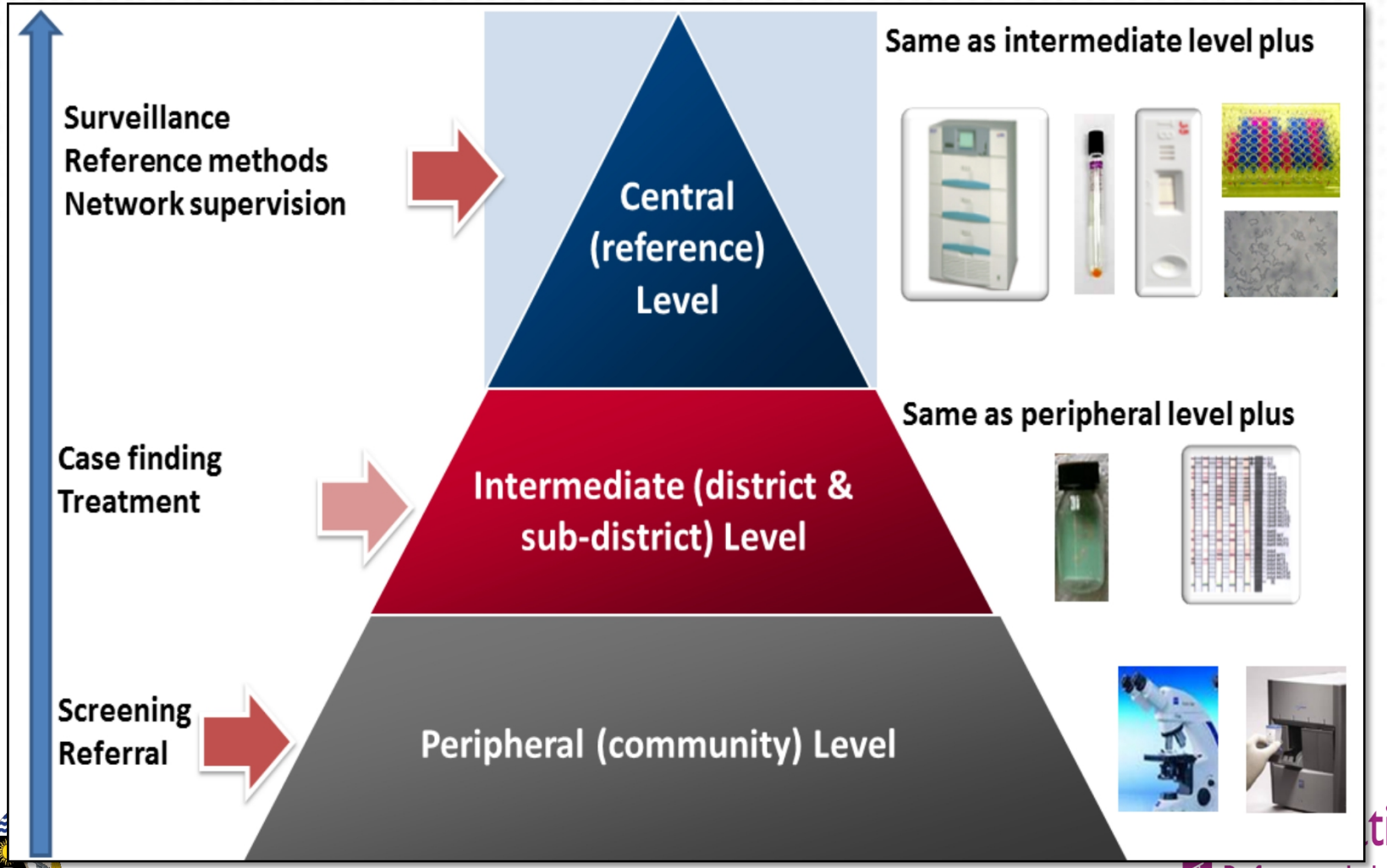
# TB BURDEN IN UGANDA

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

# TB Laboratory Network



# Peripheral laboratories

- Are located within a general dispensary, clinic or hospital
- Have limited services of TB diagnosis that may include
  - Sputum specimen collection
  - Sputum-smear microscopy
  - GeneXpert MTB/RIF testing
- Should participate in External Quality Assurance (EQA) programmes

# Intermediate laboratories..1

Are in regional or large hospitals

Have expanded services for TB diagnosis that may include

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

# Intermediate Laboratories..2

- Provide support for peripheral laboratories in terms of;
  - Supply of reagents and materials
  - Offer training, supervision, EQA of sputum-smear microscopy and GeneXpert MTB/RIF testing.

# National/Central Laboratory ..1

**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 Laboratories..2

Provide support for the laboratory network

- Organizing and participating in training, providing supervision and EQA of sputum-smear microscopy, GeneXpert 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









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