DST Result Interpretation Online Course

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WHERE WE ARE WITH DIAGNOSTIC METHODS

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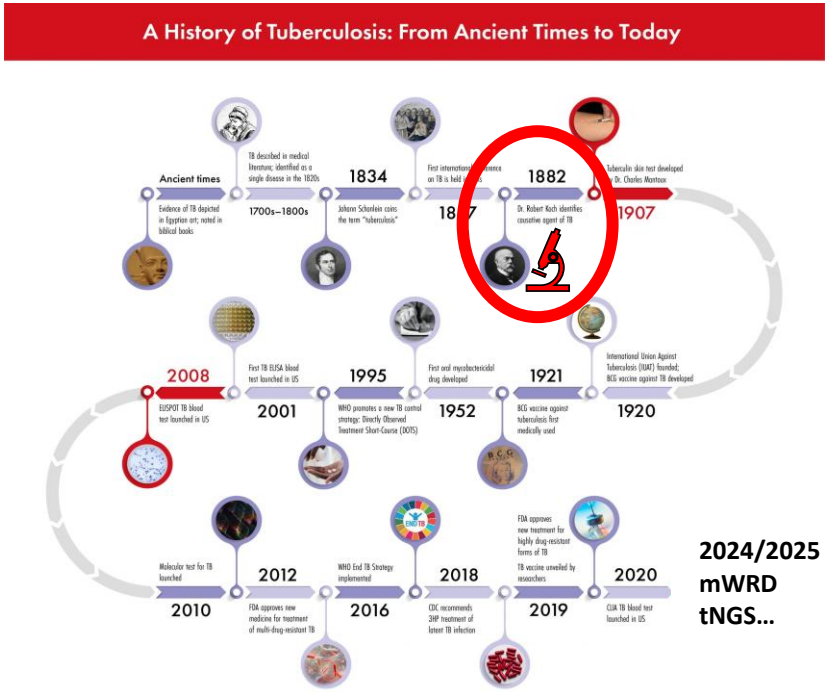
Molecular Research has Revolutionized TB and DR TB diagnostics and testing capacities



2024/2025
mWRD
tNGS…

- ✓ Rapid
- ✓ High Sensitivity & Specificity
- ✓ Reliable
- ✓ Automated

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TB Timeline: A History of TB Testing – Oxford Immunotec Medical Education

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INDISPENSABLE ELEMENTS FOR IMPLEMENTATION

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What
Tests used
Algorithms
implemented

How
Setting
Environment
Practices

Where & When

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INDISPENSABLE ELEMENTS FOR IMPLEMENTATION

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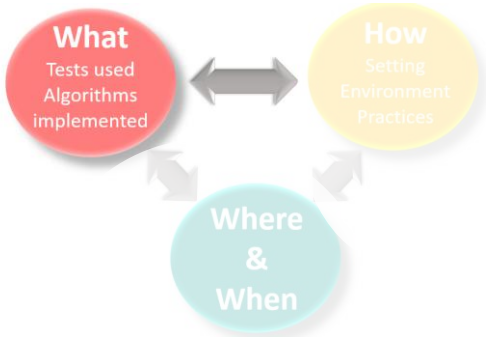

Which diagnostic methods are used

- Available Diagnostics
- Diagnostic Algorithms implemented

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DIAGNOSTIC NETWORKS

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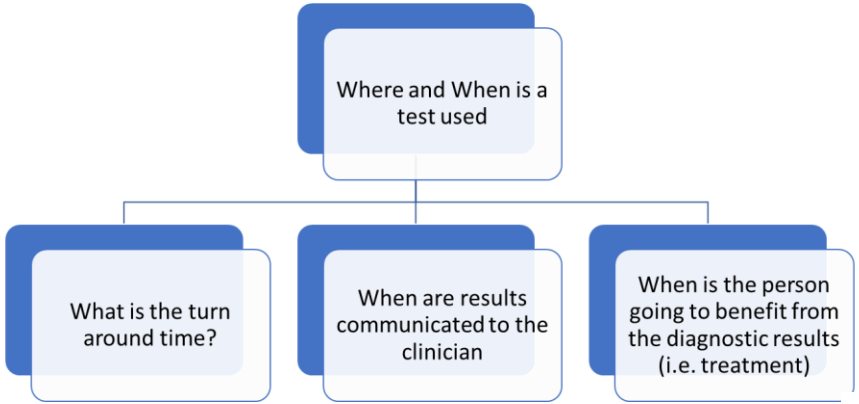
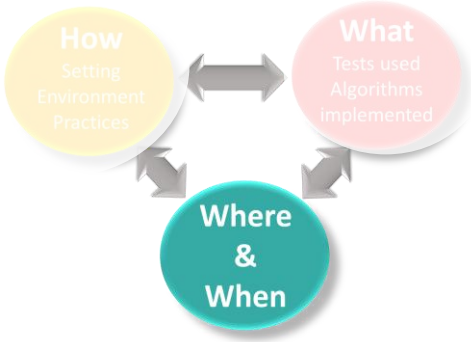
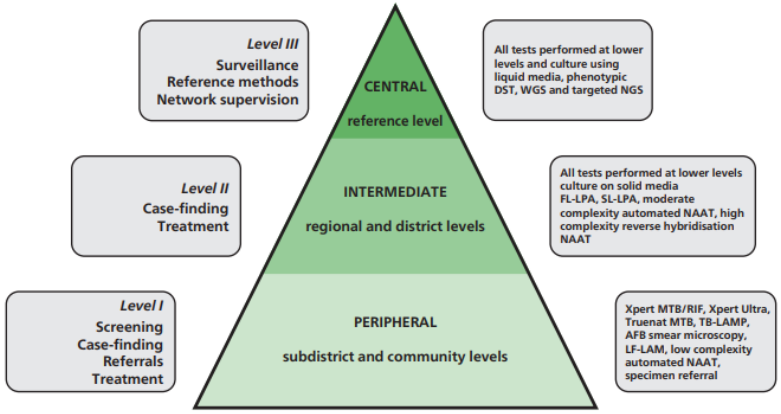




- How can we ensure that we do not lose the speed of a rapid molecular test?
- Laboratory networks
- Sample transportation systems



https://iris.who.int/bitstream/handle/10665/376155/9789240089501-eng.pdf?sequence=1

INDISPENSABLE ELEMENTS FOR IMPLEMENTATION

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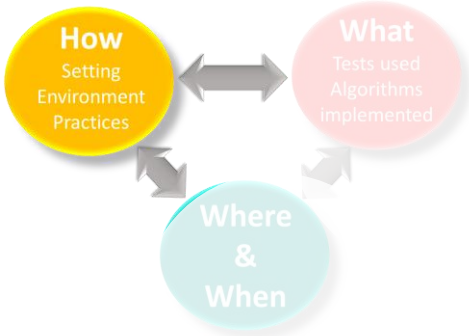
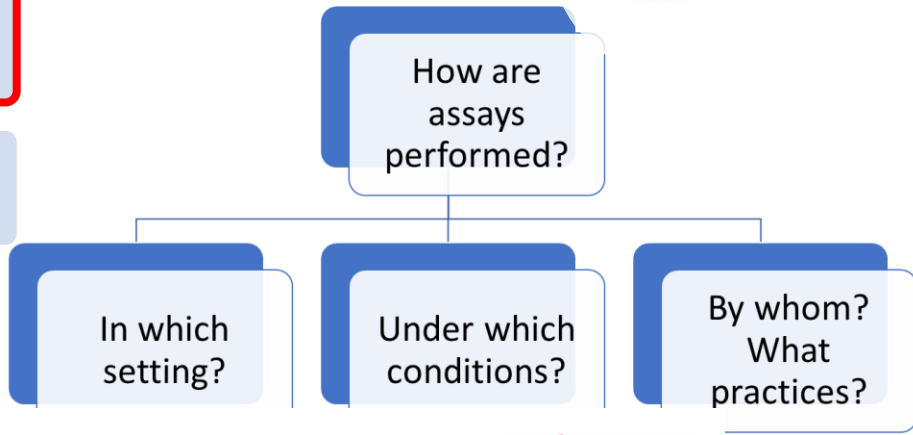
- Speed and accuracy of diagnosis
- Accuracy of result
- **Accuracy of result interpretation**
- Reliability of produced results





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Course Structure

- Principles of genotypic drug-susceptibility testing.
- Interpretation of genotypic drug-susceptibility testing assays (with main focus on Hain LPAs).
- Troubleshooting.
- How to minimize contamination and errors

OpenWHO Course on DR TB: how to interpret rapid molecular test results

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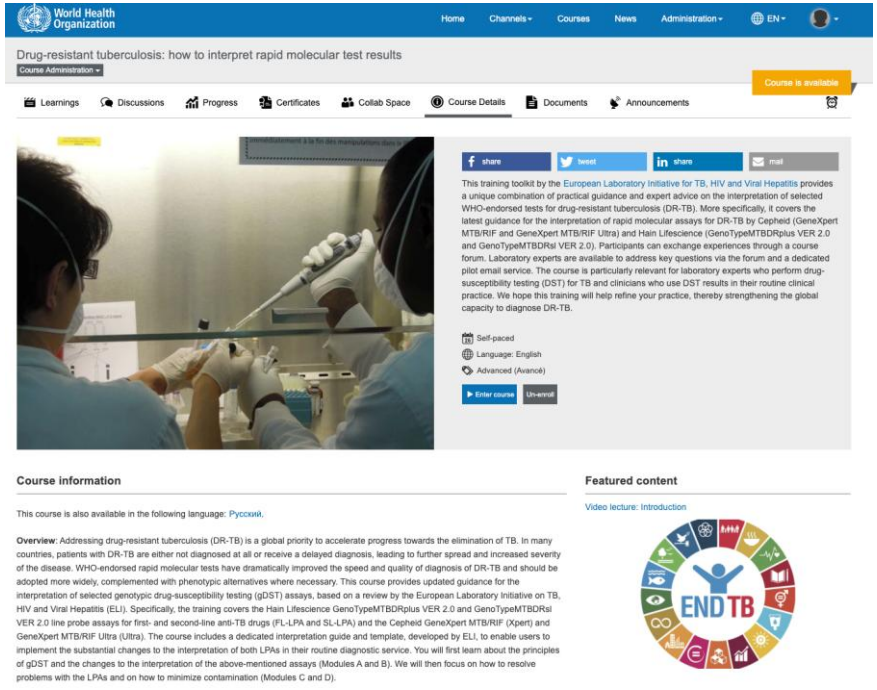

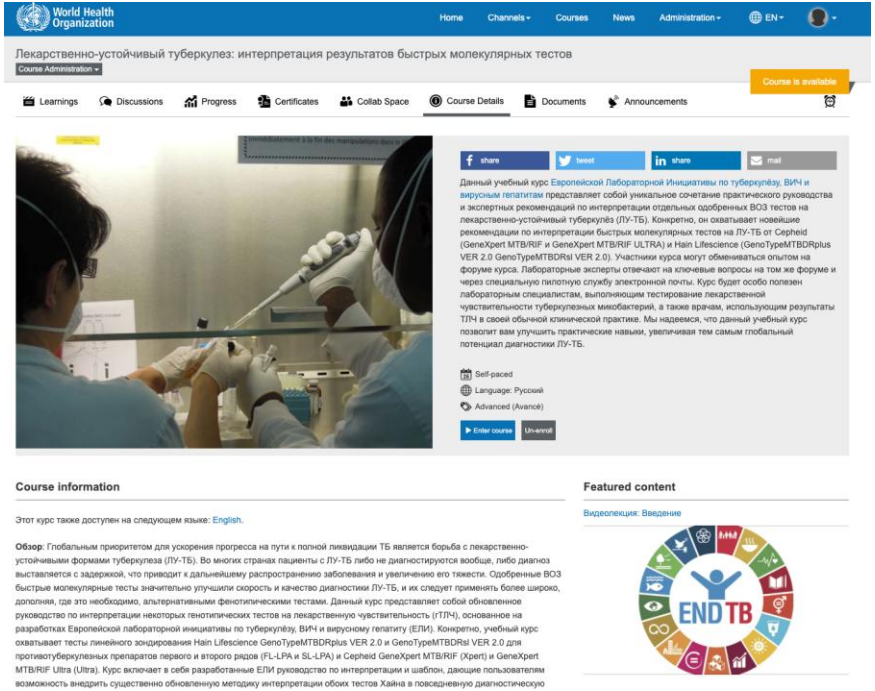

More than 30.000 users enrolled in English and Russian version

DST RESULT INTERPRETATION

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Accurate interpretation of DST results and their rational use for treatment regimens

Int J Tuberc Lung Dis. 2025 Jan 1;29(1):35-37. doi: 10.5588/ijtld.24.0263.

Further effort is needed to avoid irrational use after drug susceptibility testing for drug-resistant TB

L Larsson [1], C Corbett [2], G Kalmambetova [3], S Ahmedov [4], U Antonenka [2], A Iskakova [5], A Kadyrov [6], E Sahalchyk [2], K Kranzer [7], H Hoffmann [8]

Some potential root causes for discordance between molecular and phenotypic DST results:

- ❑ Pre-, post- and/or analytic errors
- ❑ Co-existence of non-tuberculous mycobacteria
- ❑ Silent mutations
- ❑ Mutations outside the resistance-determining region
- ❑ Heteroresistance
- ❑ Bacillary load
- ❑ Pretest probability

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Collaborative project

ELI core group members
Claudio Koeser, visiting scientist at Cambridge University
Heads of NRLs from WHO EURO HPC

ERLTB-Net consortium members, ELI and GLI core group members, FIND, UNITAID
Andrea Cabibbe and Daniela Cirillo, San Raffaele Scientific Institute
Timothy Rodwell and Anita Suresh, FIND

WHO GTB
Patricia Hall-Eidson, Carl-Michael Nathanson and Alexei Korobitsyn

WHO Regional Office for Europe
Askar Yedilbayev

German Ministry of Health. UNITAID and the EU

Hosted on the WHO Academy

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Overview of the new course content

Background:

- How mutations cause resistance (including different levels of resistance and epistasis)
- Different types of resistance and cross-resistance, and their frequencies globally
- Overview of genetic diversity of causative agents of TB

Principles of DST:

- Overview of DST methods
- Principles of gDST:
- Overview of different gDST classes/technologies:
  - Low, moderate and high complexity
  - Array, lateral flow, real-time PCR, LPA, tNGS, WGS

Overview of the new course content

WHO mutation catalogue – introduction:

- Role of catalogue and overview of methodology.

WHO mutation catalogue – practical aspects:

- How to use the catalogue and its relevance for DST result interpretation

Errors – overview:

- All DST assays yield some false resistant and false susceptible results due to either human or reagent/instrument errors that fall into three classes:
  - Random.
  - Cut-off.
  - Systematic.

Overview of the new course content

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- **Discordant results (gDST vs. gDST, pDST vs. pDST, or gDST vs. gDST) are helpful as they highlight errors that might otherwise go unnoticed.**
- **Preventative measures to minimize human errors.**
- **Different reasons for false susceptible or false resistant results with gDST and pDST.**
- **Case studies for spotting and addressing errors:**
  - Can an initial result be trusted?
  - Can results be trusted that are concordant?
  - How can one resolve discordant results?

Overview of the new course content

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- Each Module will be accompanied with a handbook for offline work and reference
- **Virtual forum for discussion and guidance open to both laboratory specialists and clinicians**
- Relevant announcement function to dissemination relevant information

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Acknowledgments

ERLTB-Net consortium members, ELI and GLI core group members, FIND, UNITAID
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German Ministry of Health, UNITAID and the EU

Thank you for your attention

For questions please contact:
ehsanis@wholint

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DIAGNOSTIC NETWORKS

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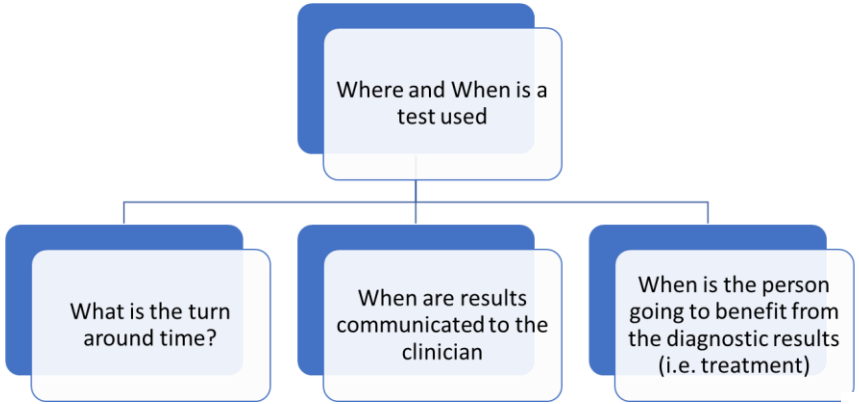

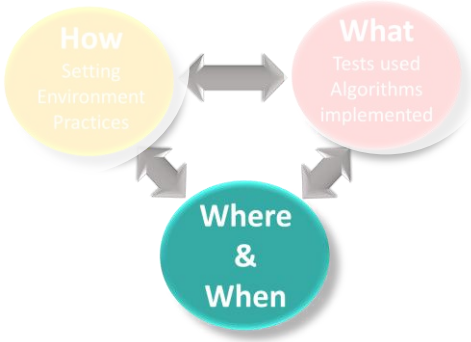

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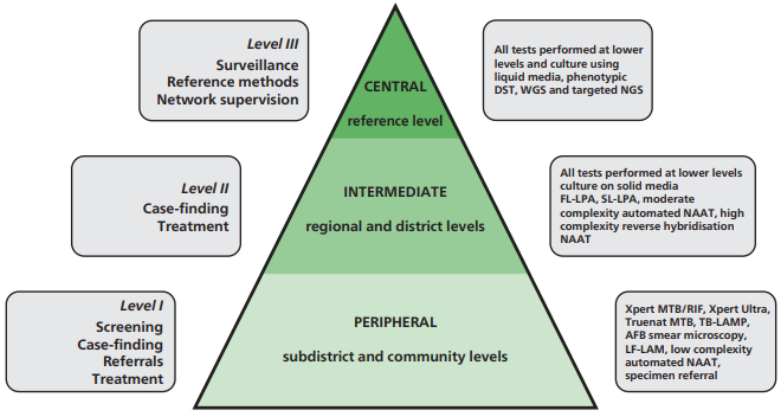

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