

DST Result Interpretation Online Course

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WHERE WE ARE WITH DIAGNOSTIC METHODS

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

A History of Tuberculosis: From Ancient Times to Today



2024/2025
mWRD
tNGS...

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



INDISPENSABLE ELEMENTS FOR IMPLEMENTATION

 **Health Topics** ▾ **Countries** ▾ **Newsroom** ▾ **Emergencies** ▾ **Data** ▾

diagnosis

16 April 2025 | Guideline



WHO consolidated guidelines on tuberculosis
Module 3: Diagnosis

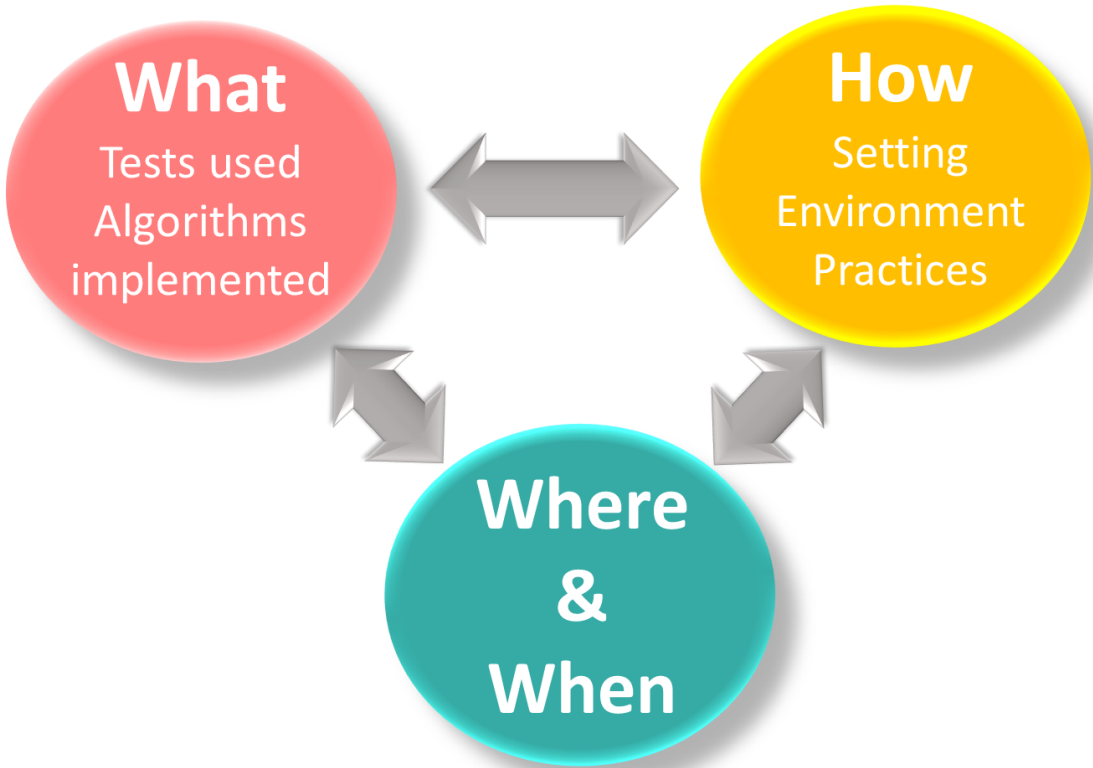
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Overview

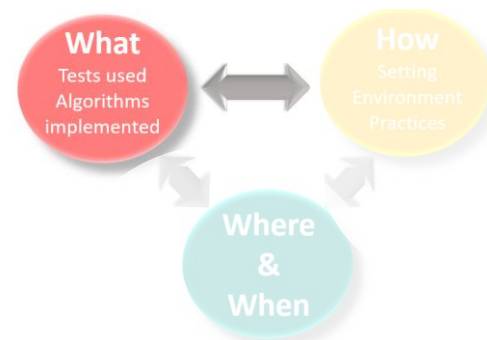
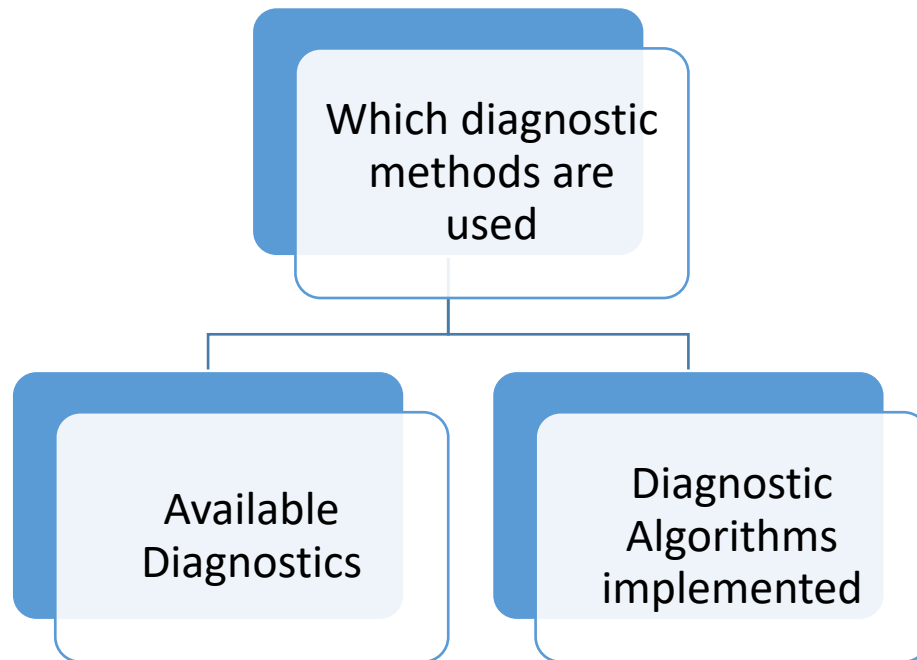
The "WHO consolidated guidelines on tuberculosis, Module 3: diagnosis" combines the WHO policy guidance on detection of TB infection, disease and drug resistance into a single reference document. Compared to the previous edition, the updated guidelines present new recommendations on concurrent testing of respiratory and non-respiratory samples among people of all ages living with HIV and children without HIV or with unknown HIV status; establish two new classes of TB diagnostic technologies for the initial detection of TB and resistance to rifampicin, and; outline current WHO TB diagnostic class determination and product assessment definitions and pathways

This document will be accompanied by the "WHO operational handbook on tuberculosis, Module 3: diagnosis", which aims at facilitating implementation of the WHO recommendations by Member States, technical partners, and others involved in managing patients with TB infection, TB disease, and drug-resistant TB.

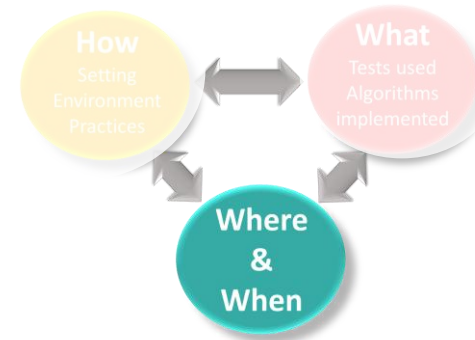
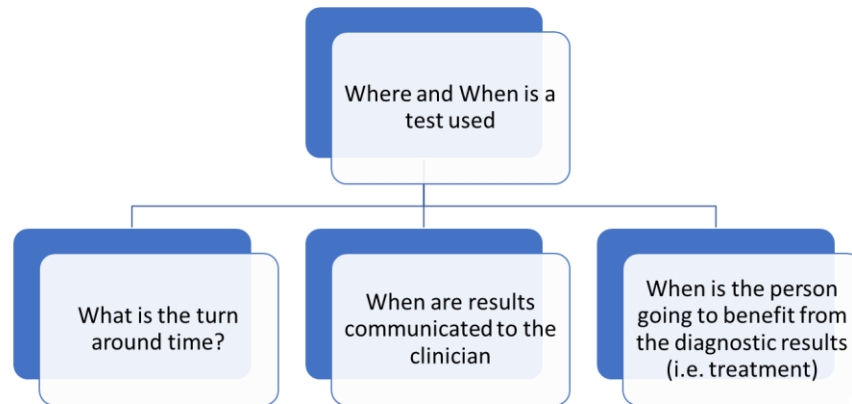




INDISPENSABLE ELEMENTS FOR IMPLEMENTATION



DIAGNOSTIC NETWORKS



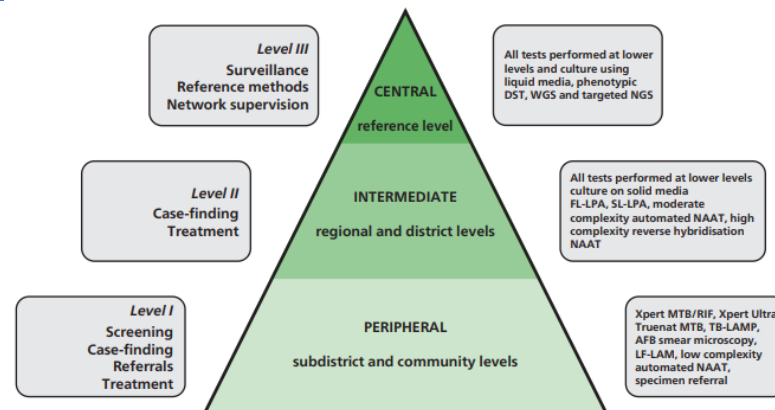
How can we ensure that we do not lose the speed of a rapid molecular test?



Laboratory networks



Sample transportation systems



INDISPENSABLE ELEMENTS FOR IMPLEMENTATION



Speed and accuracy of diagnosis



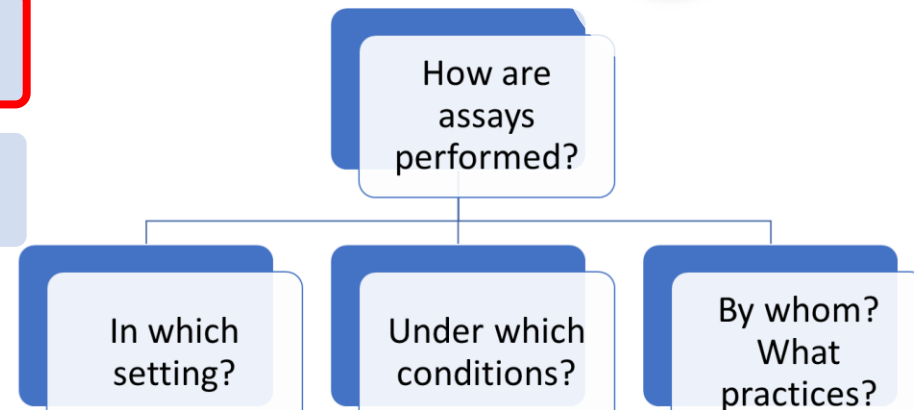
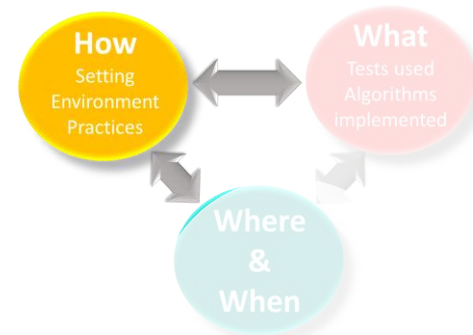
Accuracy of result



Accuracy of result interpretation



Reliability of produced results

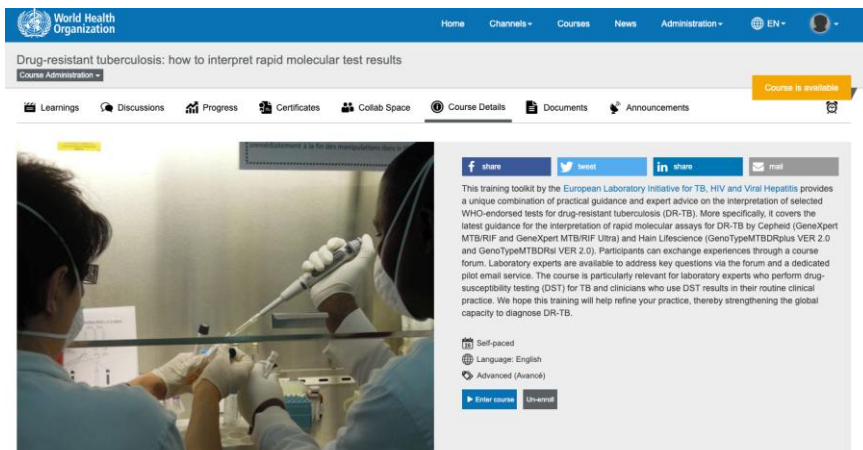


Course Structure



- ☐ 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



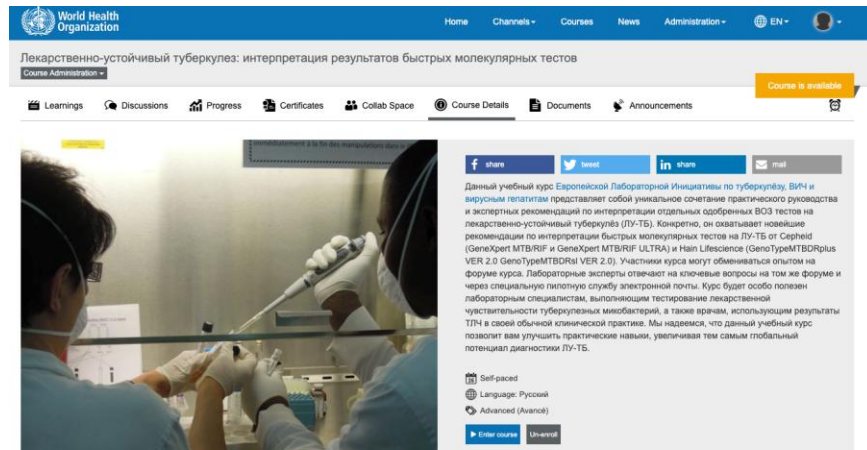
Course information

This course is also available in the following language: [Русский](#).

Overview: Addressing drug-resistant tuberculosis (DR-TB) is a global priority to accelerate progress towards the elimination of TB. In many countries, patients with DR-TB are either not diagnosed at all or receive a delayed diagnosis, leading to further spread and increased severity of the disease. WHO-endorsed rapid molecular tests have dramatically improved the speed and quality of diagnosis of DR-TB and should be adopted more widely, complemented with phenotypic alternatives where necessary. This course provides updated guidance for the interpretation of selected genotypic drug-susceptibility testing (gDST) assays, based on a review by the European Laboratory Initiative on TB, HIV and Viral Hepatitis (ELI). Specifically, the training covers the Hain Lifescience GenoTypeMTBDRplus VER 2.0 and GenoTypeMTBDRsl VER 2.0 line probe assays for first- and second-line anti-TB drugs (FL-LPA and SL-LPA) and the Cepheid GeneXpert MTB/RIF (Xpert) and GeneXpert MTB/RIF Ultra (Ultra). The course includes a dedicated interpretation guide and template, developed by ELI, to enable users to implement the substantial changes to the interpretation of both LPAs in their routine diagnostic service. You will first learn about the principles of gDST and the changes to the interpretation of the above-mentioned assays (Modules A and B). We will then focus on how to resolve problems with the LPAs and on how to minimize contamination (Modules C and D).

Featured content

Video lecture: [Introduction](#)



Course information

Этот курс также доступен на следующем языке: [English](#).

Обзор: Глобальным приоритетом для ускорения прогресса на пути к полной ликвидации ТБ является борьба с лекарственно-устойчивыми формами туберкулеза (ЛУ-ТБ). Во многих странах пациенты с ЛУ-ТБ либо не диагностируются вообще, либо диагноз выставляется с задержкой, что приводит к дальнейшему распространению заболевания и увеличению его тяжести. Одобрённые ВОЗ быстрые молекулярные тесты значительно улучшили скорость и качество диагностики ЛУ-ТБ, и их следует применять более широко, дополнив, где это необходимо, альтернативными фенотипическими тестами. Данный курс представляет собой обновлённое руководство по интерпретации некоторых генотипических тестов на лекарственную чувствительность (ГТЧ), основанное на разработках Европейской лабораторной инициативы по туберкулезу, ВИЧ и вирусному гепатиту (ЕЛИ). Конкретно, учебный курс охватывает тесты линейного зондирования Hain Lifescience GenoTypeMTBDRplus VER 2.0 и GenoTypeMTBDRsl VER 2.0 для противотуберкулёзных препаратов первого и второго родов (ФЛ-ЛПА и СЛ-ЛПА) и Cepheid GeneXpert MTB/RIF (Xpert) и GeneXpert MTB/RIF Ultra (Ultra). Курс включает в себя разработанные ЕЛИ руководство по интерпретации и шаблон, дающие пользователям возможность внедрить существенно обновлённую методику интерпретации обоих тестов Хайна в повседневную диагностическую

Featured content

Видеолекция: [Введение](#)



More than 30.000 users enrolled in English and Russian version

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



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



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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



- ❖ **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



- ❖ 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

Acknowledgments



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

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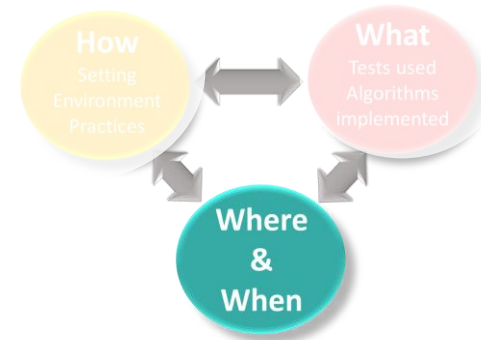
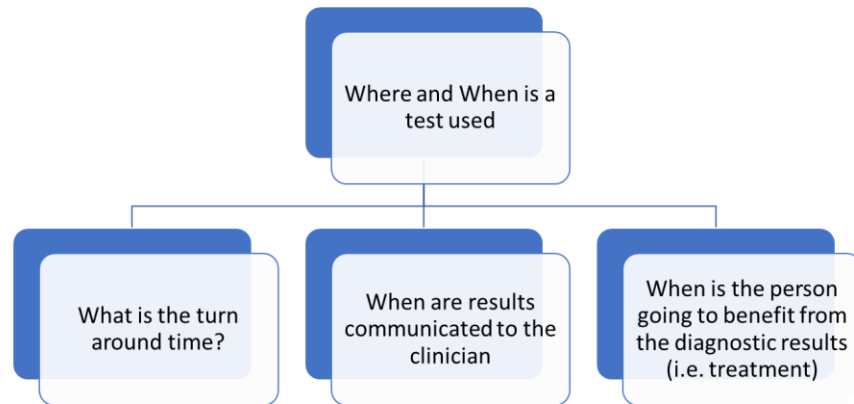


Thank you for your attention

For questions please contact:
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