FIND

AMR in TB

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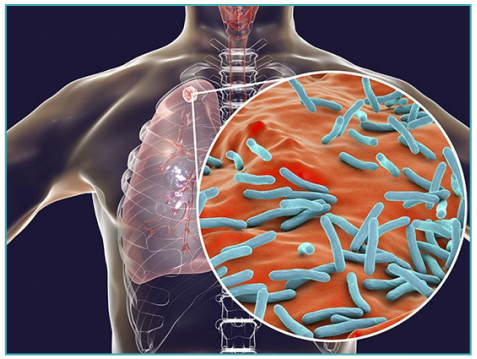
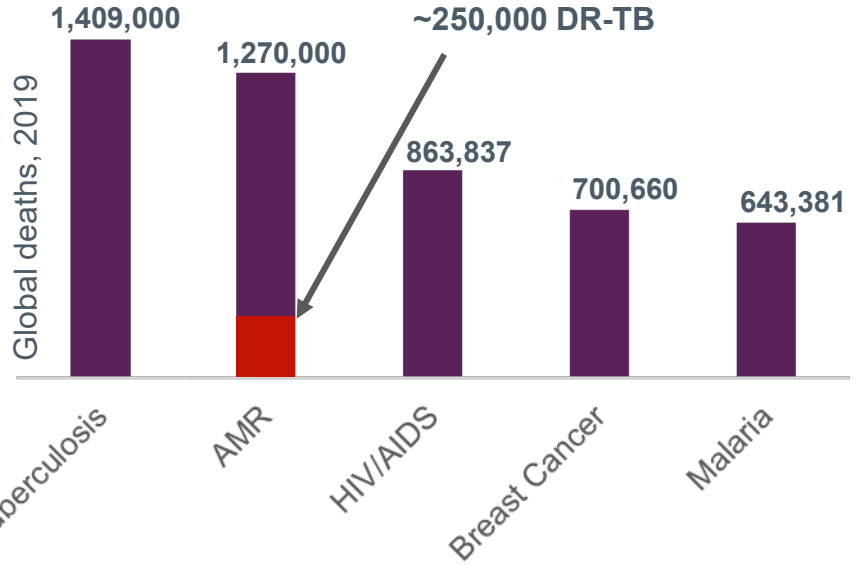
TUBERCULOSIS AND DRUG RESISTANT TUBERCULOSIS



Mycobacterium tuberculosis

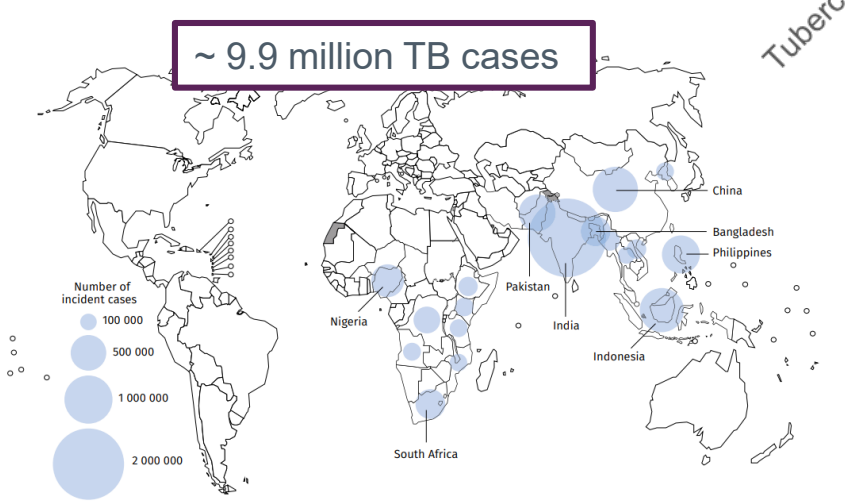


Vaccine

~100 yrs.

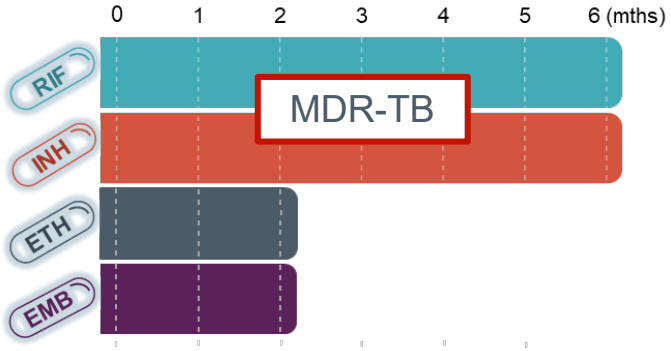
Diagnostics

>100 yrs.

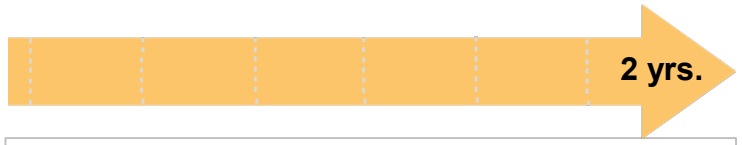


Estimated TB incidence (2020), countries with ≥ 100,000 incident cases

1st line standard treatment



2nd line standard treatment



Fluroquinolones [OFX, LFX, GFX, MFX],

XDR-TB

Second-line injectables [KAN, AMK, CAP],

CFZ, BDQ, DCS, TRD, LZD, DLM

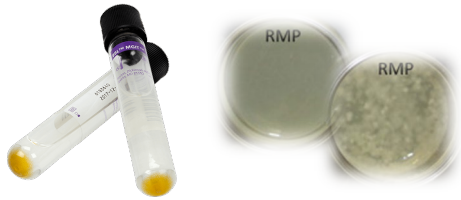
Sources: AMRSOS; Getty Images/Science Photo Library RF; WHO TB report (2021); europeanpharmaceuticalreview.com;microbiologynotes.org

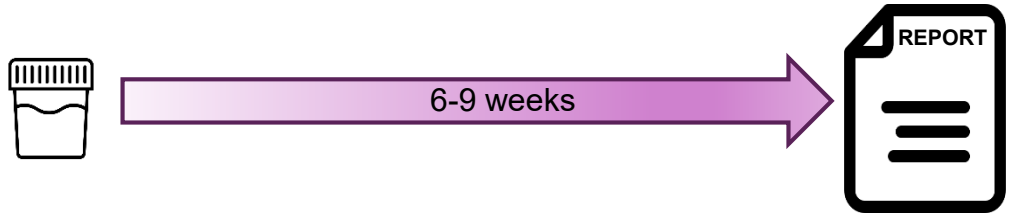
DETECTION OF DRUG-RESISTANCE IN TUBERCULOSIS

Current standard of care

Phenotypic DST

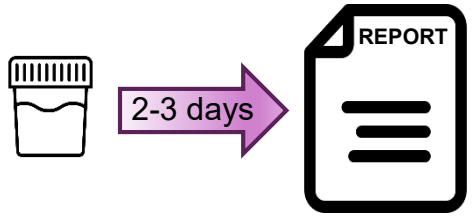
- Growth or inhibition of bacterial culture and DST
- Laborious, high biosafety requirements





Rapid molecular tests

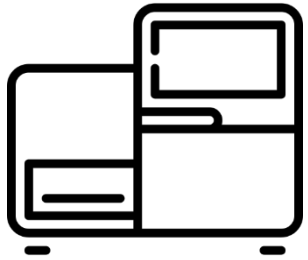
- Detect mutations in one or more gene targets
- Predict resistance to 1st and (some) 2nd line

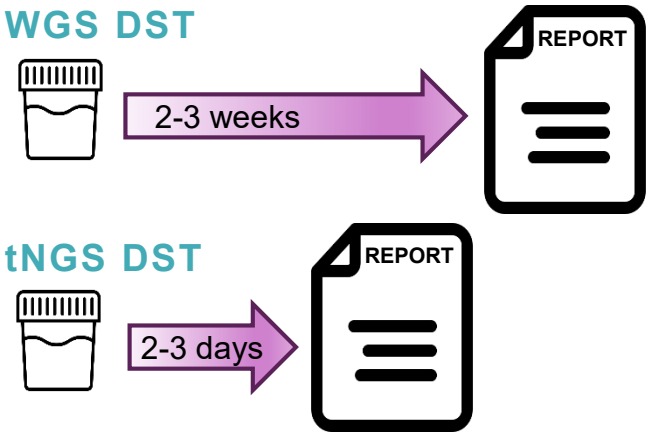


NGS

WGS & tNGS

- Comprehensive; predict resistance to all 1st and 2nd line
- Rapid compared to phenotypic DST
- Adaptable to new genes and mutations
- Performed directly from clinical specimen (**tNGS**)
- High throughput, scalable, lower biosafety requirements





NGS FOR DRUG-RESISTANT TUBERCULOSIS

Key potentials

- Surveillance
- Easy identification
- Early response

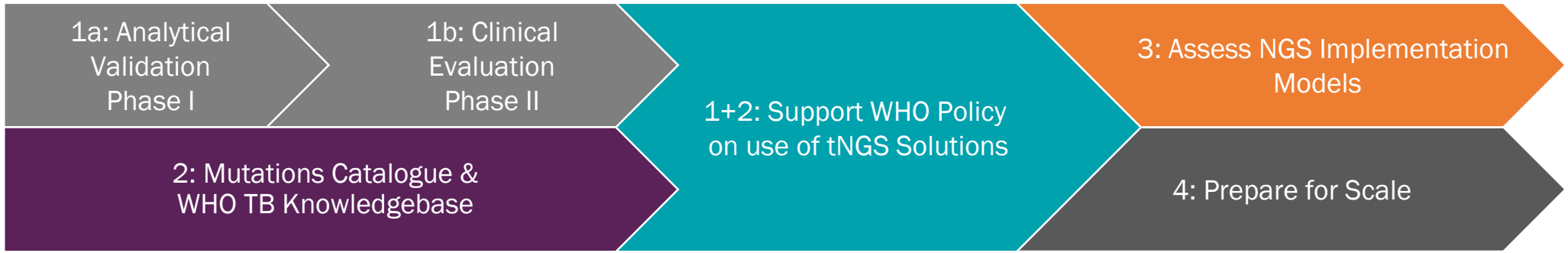
Key access barriers

- Innovation and availability: No existing pipeline of sequencing solutions for rapid and comprehensive DR-TB diagnosis direct from clinical specimens
- Quality and affordability: Lack of standardized, high-quality, evidence-supported end-to-end solutions with access pricing

RAPID, COMPREHENSIVE tNGS SOLUTIONS FOR DR-TB DIAGNOSIS IN LMICS

SEQ & TREAT

Generate evidence and boost in-country capacity to support the global adoption of end-to-end solutions for tNGS for comprehensive diagnosis of DR-TB



ONT MinION

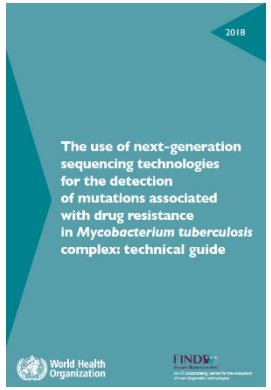
Illumina iSeq

Illumina MiSeq

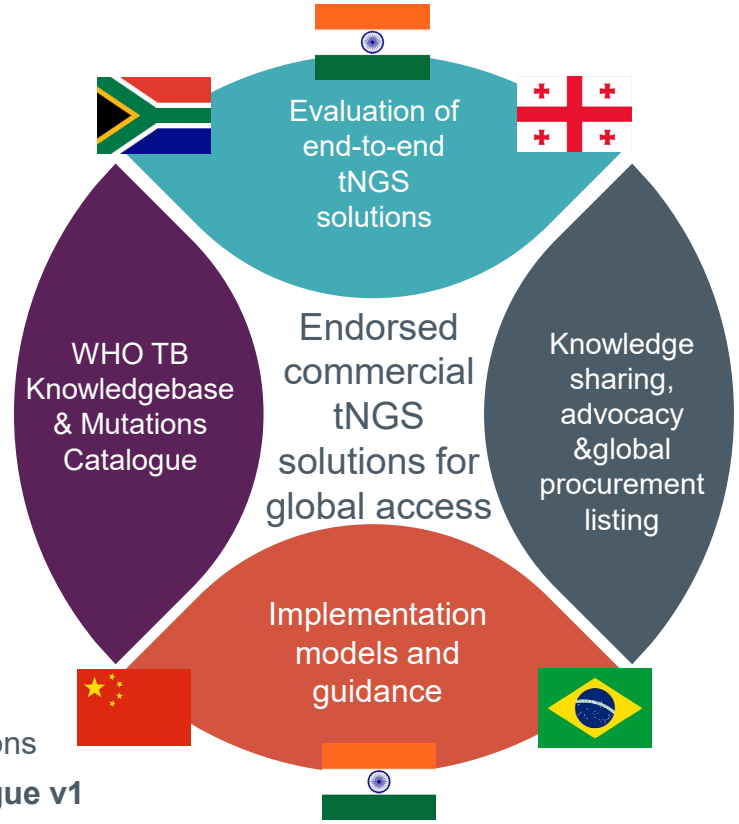
https://www.finddx.org/at-risk-populations/seq-treat/

SEQ & TREAT OUTPUTS

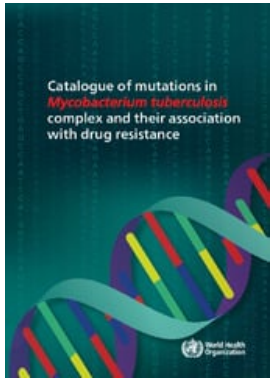
Output 1



- Technology selection
- Phase I – Analytical validation
- Phase II – Clinical Evaluation
- **Evidence dossier**



Output 2



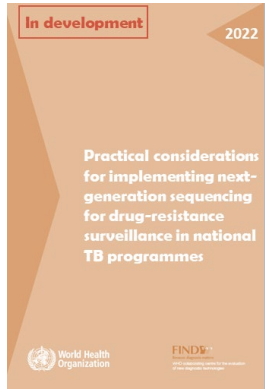
- **Knowledgebase**
  - Genomic and phenotypic data
- **Interpretation**
  - Phenotype-genotype correlations
  - **Global TB mutations catalogue v1**
    - 38,000 isolates, 40 countries
    - Phenotypic data (13 anti-TB drugs)
- **Reporting**
  - Standardized clinical report
  - Surveillance

Output 4

- **Cost-effectiveness and impact modelling**
  - Implementation and scale-up
- **NGS products into procurement lists**
  - GDF, Global Fund
- **Engage manufactures**
  - Market challenges
  - Improve access
- **Develop and disseminate materials**
  - Training materials, implementation guidance

Output 3

- **Understand baseline capacity**
  - NGS and TB-DST workflows
  - Needs assessment, situational analysis
- **Country-specific models and implementation roadmap**
  - NGS delivery in-line with national testing and surveillance strategies for TB
- **Conduct optimal network design**
  - Incorporate use of NGS for DR-TB diagnosis and surveillance

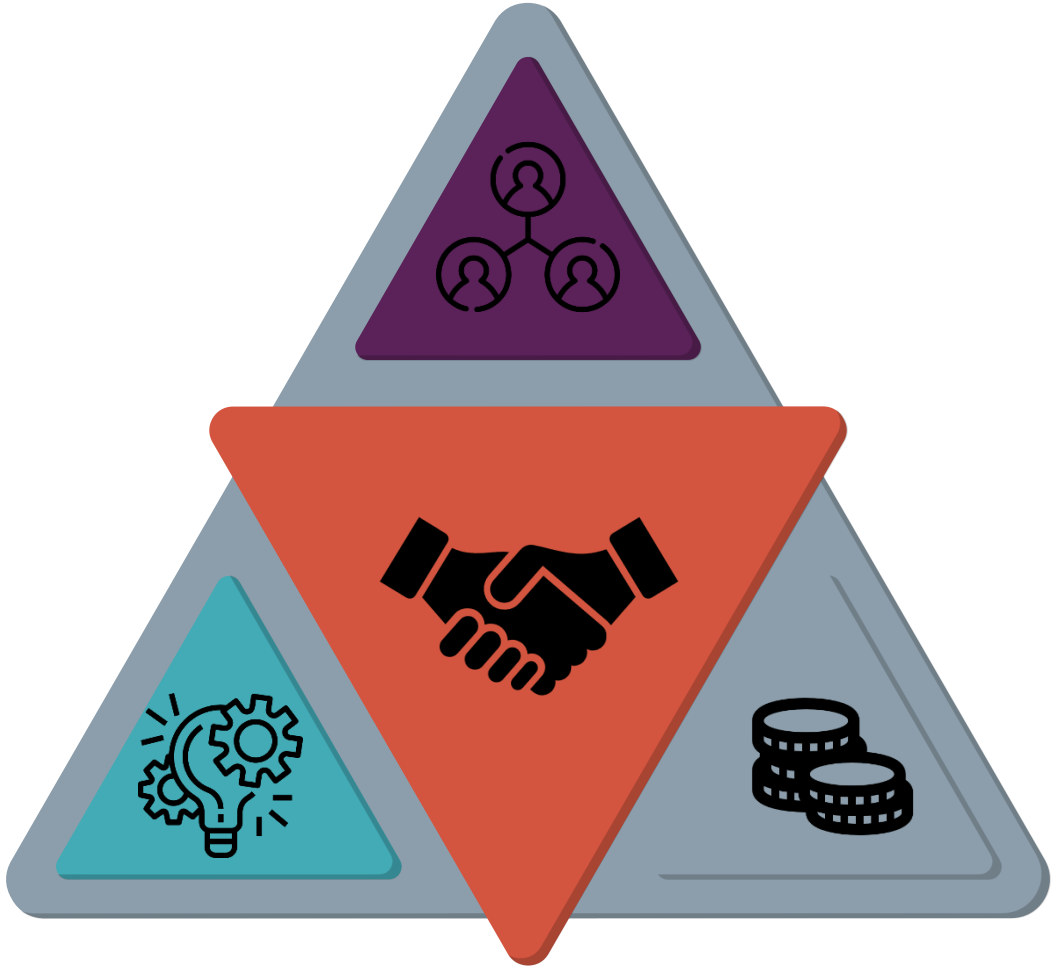


KEY PILLARS

Policy makers & Implementation

Governments, Non-governmental organizations,

WHO etc.



Technology Innovation

Manufacturers, Researchers,
Developers etc.

Funders

Global Fund, Unitaid,
Philanthropic donors etc.

THE GENOMICS AND SEQUENCING TEAM

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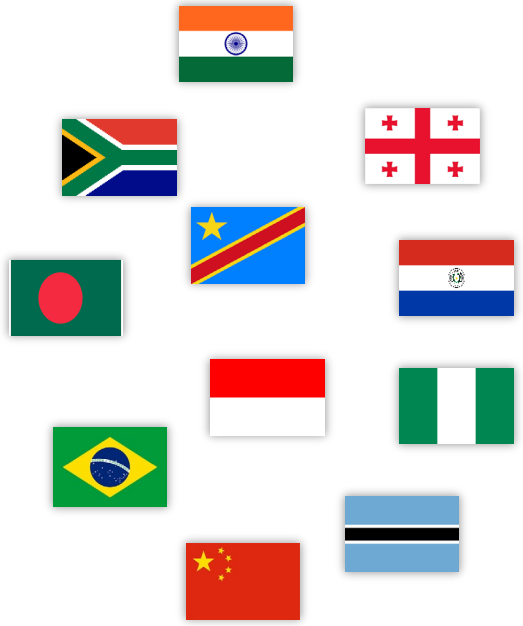
.. and country partners



www.finddx.org/sequencing