

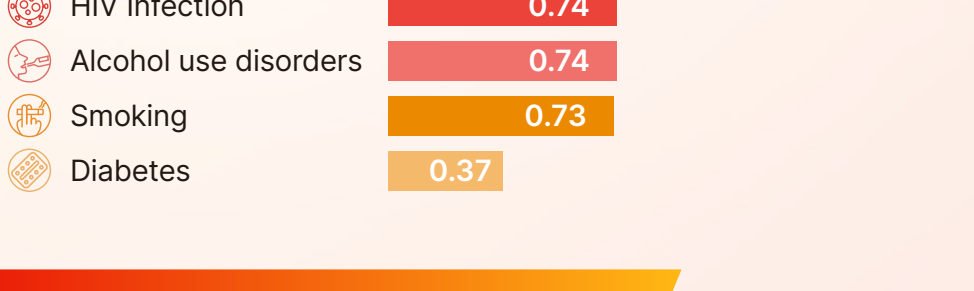
# A clearer picture of drug resistant TB



## ABOUT TB

**#2** Tuberculosis (TB) is the second leading infectious killer after COVID-19, yet it is a preventable, treatable and curable disease. **(In 2020, TB was the 13<sup>th</sup> leading cause of death globally)<sup>1</sup>**

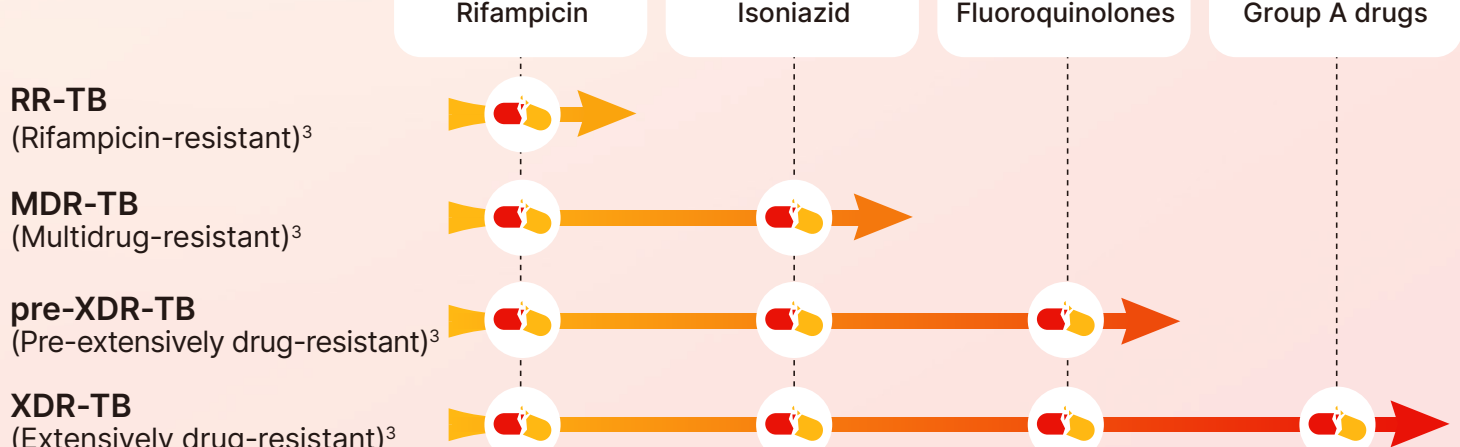
### TB DETERMINANTS



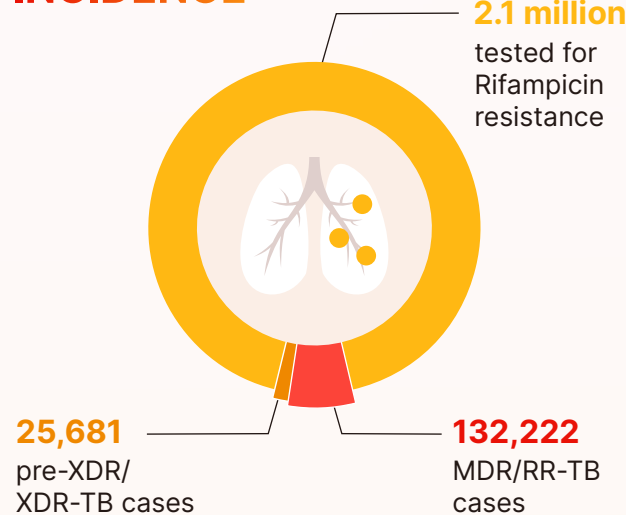
In 2020<sup>1</sup>

- 10M** Incidence
- 1.5M** Mortality

## DRUG RESISTANT TB

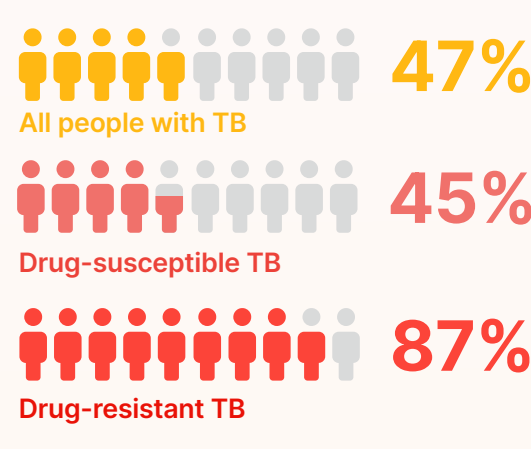


### INCIDENCE



### ECONOMIC BURDEN

TB and DR-TB usually affect active workers, resulting in lost income and catastrophic costs (costs that account for more than 20% of household income). % of TB cases that experience catastrophic costs:<sup>2</sup>



## TREATMENT

**150,000** patients started treatment for MDR/RR-TB in 2020<sup>2</sup>

### Cost of TB

|  | TB  | MDR-TB                       | XDR-TB                       |
|--|---|------------------------------|------------------------------|
| <b>Average cost per case<sup>4</sup></b><br>including direct treatment costs and productivity losses (2020; USD) | \$ <b>67,000</b>  | \$ <b>420,000</b>            | \$ <b>801,000</b>            |
| <b>Length of treatment<sup>4</sup></b><br>(months)   | <b>6-9</b>  | <b>20-26</b>                 | <b>32</b>                    |
| <b>Survival Rate</b>   | <b>86%</b> new, 2019 <sup>5</sup><br><b>74%</b> relapsed, 2019 <sup>6</sup> | <b>59%</b> 2018 <sup>7</sup> | <b>52%</b> 2018 <sup>8</sup> |

## DRUG RESISTANCE SURVEILLANCE AND DRUG SUSCEPTIBILITY TESTING (DST)

Routine TB drug resistance surveillance and drug-susceptibility testing (DST) are critical to combat the global TB epidemic. DST helps determine appropriate TB treatment regimen.

### CURRENT DST METHODS

**Next-generation sequencing (NGS)**

**<48 hours**  
Comprehensive DST of first-line drugs (FLD) and second-line drugs (SLD).

Next-generation sequencing (NGS) enables accurate and high-throughput decoding of *Mycobacterium tuberculosis* genetic information. It is a fast, sensitive, scalable and culture-free DST method that provides a comprehensive anti-TB drug resistance profile.

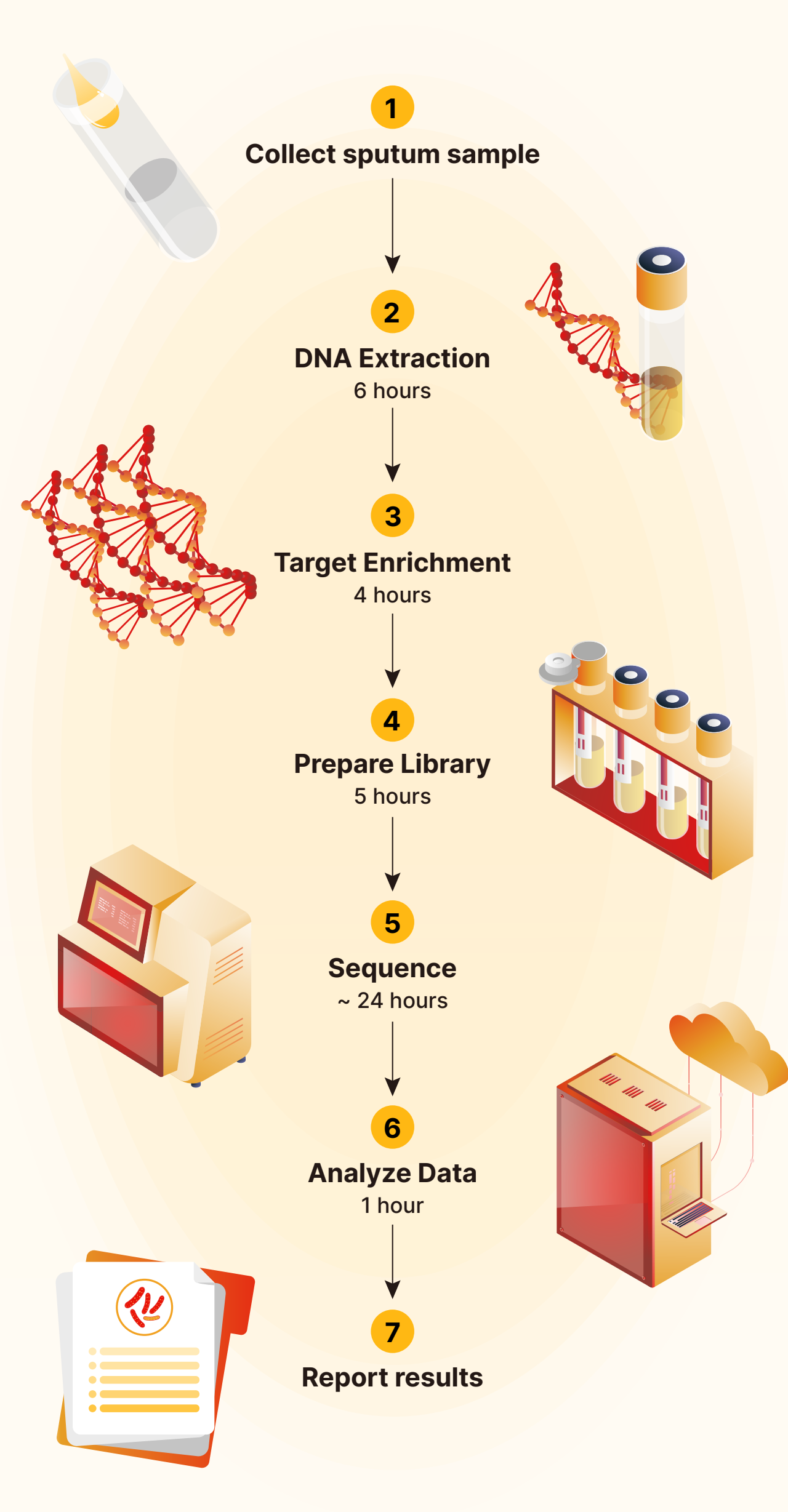
**Phenotypic – solid media**  
6 weeks for DST<sup>9</sup>

**Phenotypic – liquid**  
1-2 weeks for DST<sup>9</sup>

**Nucleic acid amplification tests**  
Approx. 2 hours.<sup>9</sup>  
Targeted DST to detect resistance to some FLD and SLD.

## NGS WORKFLOW

**SIMPLE FAST ACCURATE**



### INSIGHTS OBTAINED THROUGH NGS IN <48 HRS

- Accurate characterisation of nucleotide-level genetic polymorphisms.
- Detailed sequence information for multiple gene regions or whole genomes.
- Predict resistance to a wide range of first- and second-line antitubercular drugs.
- Detection of mixed infection and heteroresistance down to 3% subpopulations (inaccessible by other rapid molecular tests).
- Genotyping and spoligotyping of *Mycobacterium tuberculosis* complex (MTBC) strains.
- Differential identification of mycobacterial species with clinical relevance.

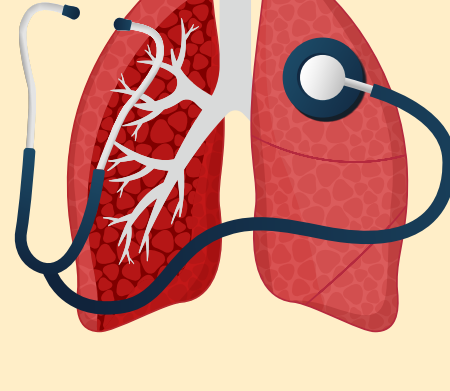
### NGS IS A MULTIFUNCTIONAL TOOL

- Revolutionize universal access to accurate drug-susceptibility testing (DST).
- Routine TB drug resistance surveillance.

## OUTLOOK

### 66M LIVES WERE SAVED

Approximately 66 million lives were saved through TB diagnosis and treatment between 2000 and 2020.<sup>1</sup> Improved drug susceptibility tests and drug resistance surveillance possible through next-generation sequencing will facilitate better TB treatment and diagnosis, which will bring us closer to the Sustainable Development Goal (SDG) goal of ending TB by 2030.



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