



2018 SKILLS BUILDING PROGRAM

# BIG DATA, ARTIFICIAL INTELLIGENCE AND DECISION SCIENCE IN HEALTH AND NUTRITION

## Interpreting analysis results and extracting key messages and recommendations

*In partnership with*





- Optimization results and recommendations will differ depending on:
  1. Type of TB epidemic
    - Which key populations are affected?
  2. Time horizon, e.g., 2018-2020, 2018-2030, 2018-2035
  3. Budget level
  4. Programs
    - Parameters which get influenced by particular programs
    - Unit costs
    - Cost function values, e.g., saturation, outcome in the absence of or under maximum coverage of programs

# Case study – the TB epidemic in Belarus

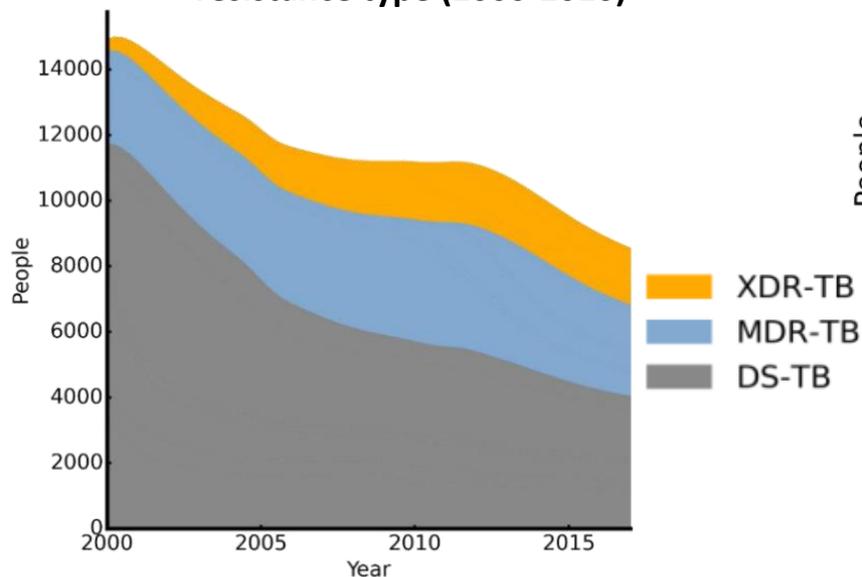


- Background: “Belarus has a **contracting TB epidemic** with increasing drug-resistance and MDR-TB challenges: 37% of new cases and 69% of re-treated cases are MDR-TB”
- Epidemic characteristics:
  - Highly affecting men, 75% of incident TB cases are among males
  - Exceptionally high levels of drug-resistance
  - Large variation in treatment outcomes

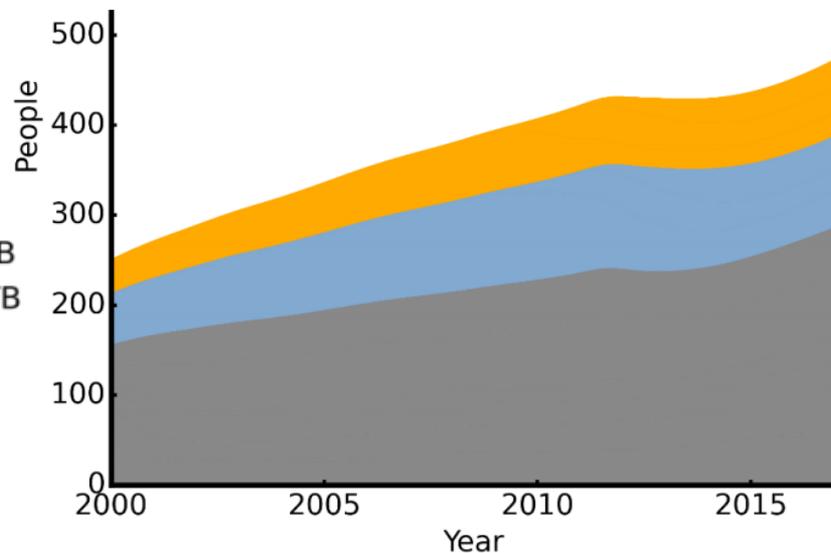
# Epidemic trends estimated by Optima TB in Belarus



**Trends in the estimated number of people aged 15-64 with active TB in Belarus by drug-resistance type (2000-2016)**



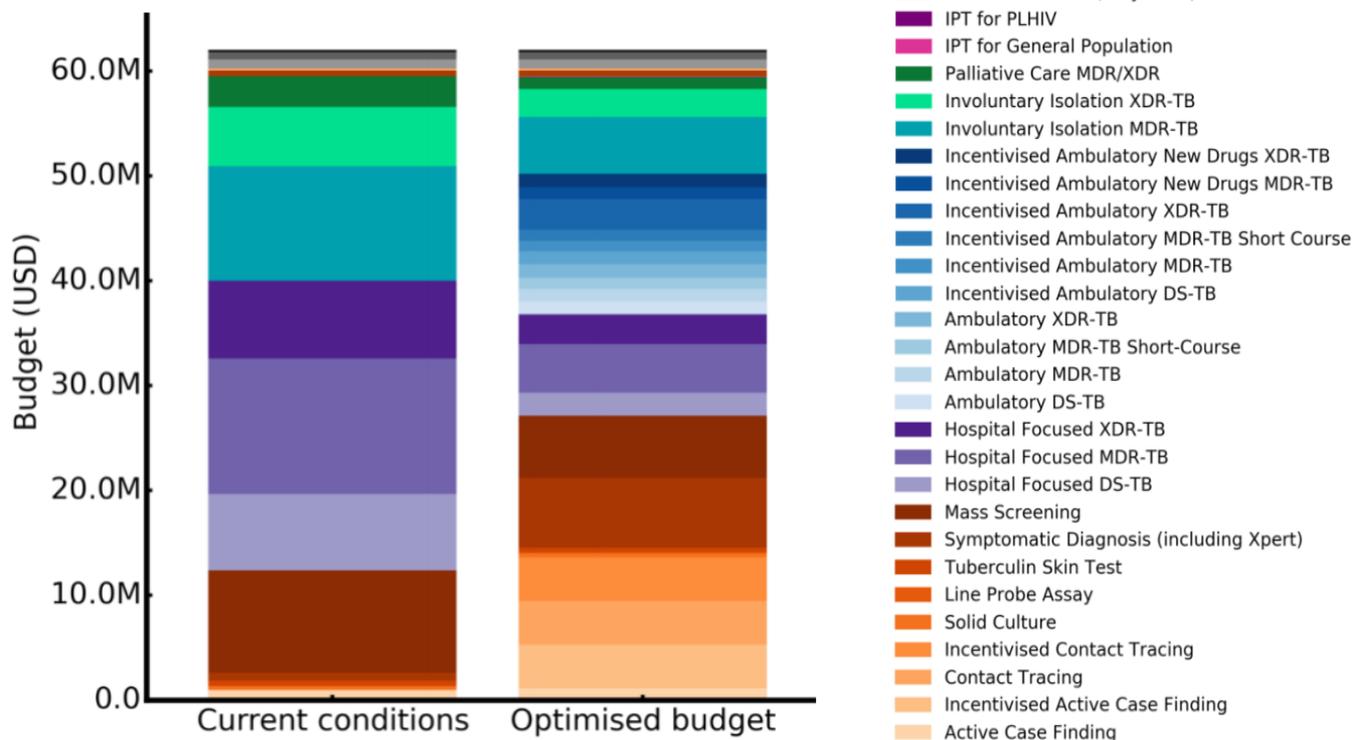
**People living with HIV who have active TB by drug-resistance strain**



# Key findings – optimization in Belarus



- Reallocation of 2015 funds show an **increase** in funding of:
  - Enhanced /incentivized contact tracing and active case finding among key populations
  - Incentivized ambulatory care
  - New TB drug regimens
  - Rapid-molecular testing

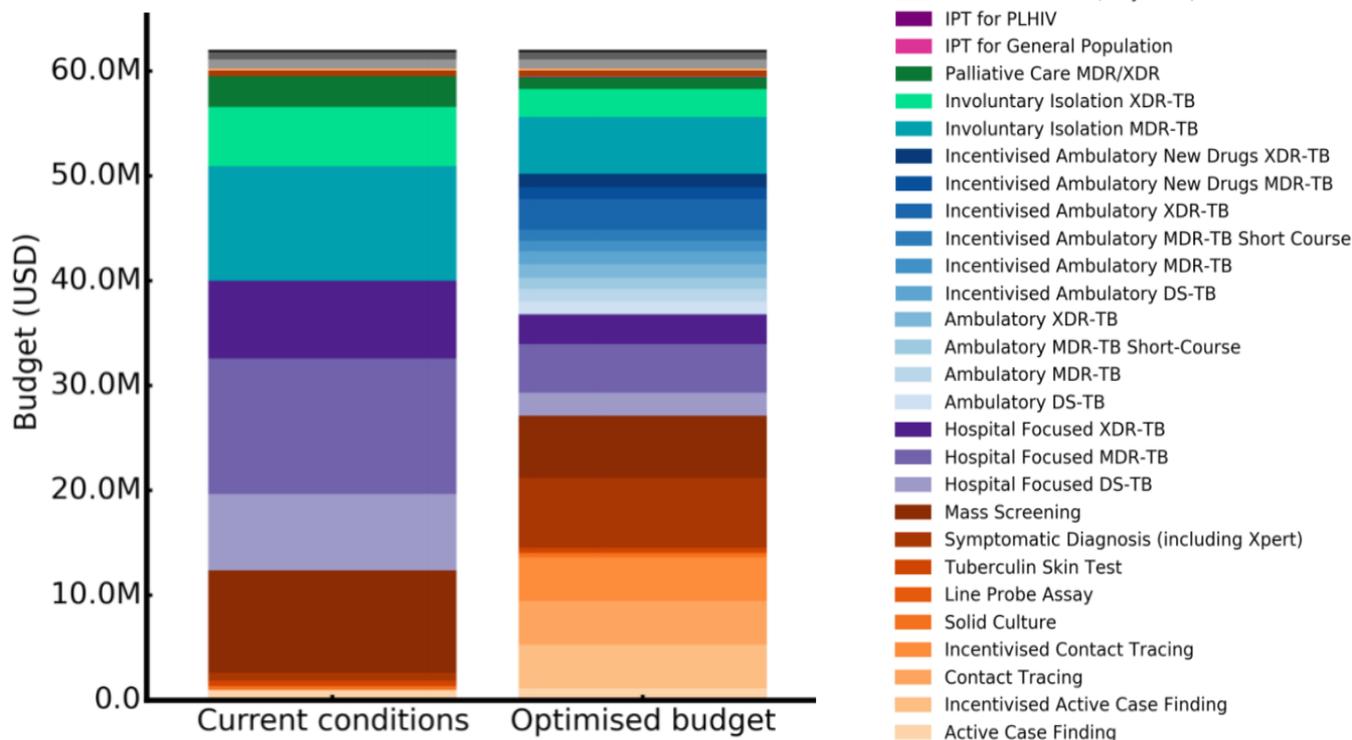


# Key findings – optimization of 2015 TB funding in Belarus



- Reallocation of 2015 funds show a **decrease** in funding of:

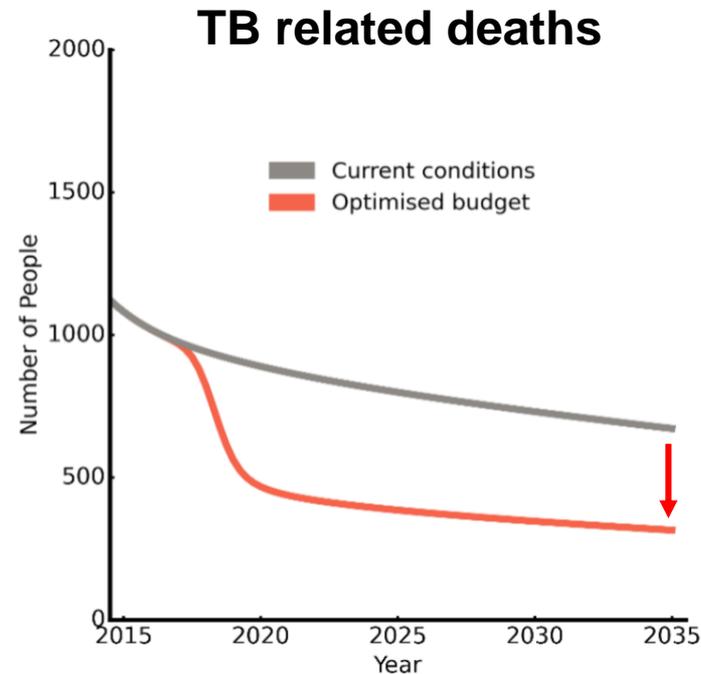
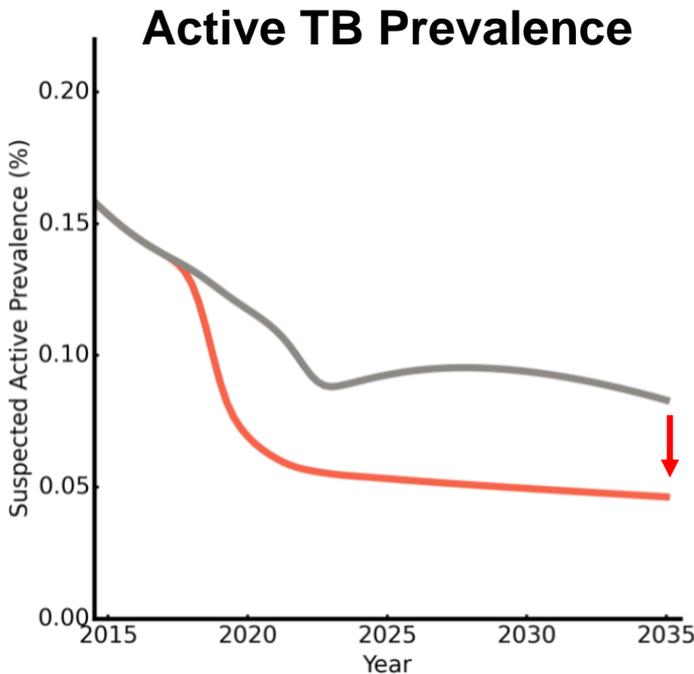
- Hospital based treatment modalities
- Mass screening
- Involuntary isolation
- Palliative care



# Epidemiological outcomes for general population (aged 15-64) for Belarus 2015-2035



- The same budget for TB-related activities in 2015 could achieve the following by 2035:
  - Reduce prevalence in the general adult population by up to 45%
  - Reduce the total number of TB deaths by up to 60%
  - Reduce TB incidence among PLHIV by up to 45% and TB prevalence among PLHIV by up to 30%.





- Transition from hospital-focused to ambulatory treatment modalities reduce the costs and free funding for effective treatment strategies.
  - High and long hospitalization is the primary cost driver of the TB response in Belarus.
- More targeted screening approaches could increase diagnostic yield.
  - Mass screening of entire adult population is expensive for the number of cases identified
  - Targeted screening (PLHIV, Prisoners) and contact tracing, would be more effective

# Understanding the Outputs/Results



## 1. Consider the limitations

- Data gaps and assumptions?
- Simplifications?
- Covering up important heterogeneities?
- Effects of time horizons?

## 2. What might drive the results?

- Can a simple deterministic sensitivity analysis be done (scenario type)?

## 3. Capturing current?

- Do the results describe the current situation, or use historical data – how might it affect conclusions?
- Is there a need for re-analysis, maybe because policy has moved on, or new data has come out?

## 4. Representativeness

- For a setting, population, area

# Review Model Outputs and other Results obtained



- 1. What findings** - review, from the descriptive to the analytical/modelling outputs – sometimes a large amount of different types of results
  - Simple descriptive findings might be as valuable as model outputs
  - Order findings by research question/objective – most important results?
  - Useful “by-products” - assessment of guidelines, benchmarking, unit cost
- 2. Do findings hold up** - review and consider them carefully
  - Plausibility - Do they make epidemiological sense? Match understanding of what interventions work and their effects? Concur with any findings from comparable studies or real-world experiences?
  - Are any results sensitive for dissemination? E.g. potentially undermining an important program, or clash with political reality?
- 3. Are findings supported** by solid data?
  - Disclaimers need?



Important: Express the **uncertainty** of modelled estimates

- Describe model-related and data related limitations
  
- Follow a clear sequence
  - Description of outputs (Results section)
  - Interpretation and contextualisation of these findings (Discussion)
  - Drawing policy-relevant lessons on how HIV response can be improved (Recommendations)
  
- **Lack of clarity minimises the usefulness of the results**
- For policy-makers in deciding which allocative changes to make
- For implementers to change practice

# Considerations when interpreting results



- Ensure results seem reasonable
  - This may also require reviewing model inputs, as results are only as reliable as model input and assumptions used
  
- Again different objectives, time horizons and budget levels will lead to different results
  
- All model projections are subject to uncertainty
  - Estimates are indicative of trends rather than exact values
  
- Consider implication of recommendations
  - May be ethical, economic, and political considerations
  - Feasibility



QUESTIONS?