# Demo project exercises/learning opportunities

## Calibration

1. Initialization parameters aren’t perfect – note the ongoing trend in **Active prevalence** is that prevalence in all populations converges, so it is unlikely that they were so different in year 2000.

**Exercise:** tweak Initialization proportions of the population with active TB until early years are smoother and more consistent with later years

1. **Active TB** cases look to be slightly too high in the general population (green line)

**Exercise:** tweak infection vulnerability factor and/or late latency departure rate to better match this

Similarly, latent TB for children (blue line) was too low in 2000 it appears, and could be adjusted

1. **New active SN-XDR diagnoses:** The data points for prisoners for the number of diagnoses are unable to be matched in the model because there are not enough prisoners with undiagnosed SN-XDR TB available to diagnosed (also true on some other plots)

**Exercise:** tweak TB smear/strain values for the proportion of the population that are SN-XDR in prisoners until this and other plots are able to at least match the data – adjustments to population infectiousness/vulnerability for prisoners may also be necessary/appropriate.

## Scenarios

1. Try running some different scenarios with budgets shifted around between the programs, observe results

## Optimizations

1. The output defunds active case finding entirely and puts the money into passive case finding. This is because there is no constraint (saturation/capacity) on the program at the moment, so the optimization doesn’t know that you can’t diagnose all cases of active TB with just the cheapest modality, so it is always optimal to move from active case finding to passive case finding.

**Exercise:** Put a limit on passive case finding (perhaps equal to the current budget) and see how the results change

1. With no objective functioning prioritizing XDR-TB, the optimization has defunded expensive XDR treatment entirely in favor of more DS diagnosis/treatment.

**Exercise:** Discuss how you would deal with this in your country?

1. Acceptable, more people treated minimizes deaths – until enough budget is available to treat everyone we should focus on DS/MDR cases being treated correctly so that less people acquire MDR/XDR
2. Apply a constraint to XDR program funding so that it is at least maintained in the optimization as a matter of ethics and preventing primary transmission
3. Rerun with a different objective weighting so that minimizing active XDR cases is a priority
4. Other?